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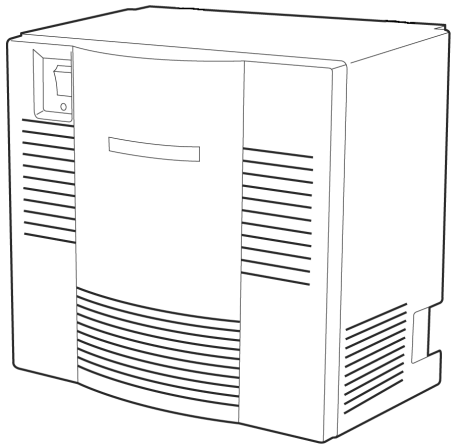
NEC

Electra Elite® 48



SYSTEM HARDWARE MANUAL

CD Stock Number 750336

Issue 7

(Series 9500)

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Technology Development

Preface

GENERAL INFORMATION

Congratulations! You have purchased the NEC Electra Elite System.

The Electra Elite 48 system is a feature-rich key system that provides over 200 features including Computer Telephony Integration, Least Cost Routing, Uniform Call Distribution, ISDN-PRI Voice Trunks, ISDN-BRI Voice Trunks, T1, LAN/KTS Cabling Integration. Voice over Internet Protocol (VoIP), and many others.

The Electra Elite 48 system provides the customer needs today, and as business expands the system can be expanded to grow as well.

The Electra Elite 48 system has a set of manuals that provide all the information necessary to install and support the system. This preface describes these manuals.

THIS MANUAL

This manual contains detailed instructions to install the Electra Elite 48 KSU, ETUs, Multiline Terminals, and optional equipment in the following chapters.

Chapter 1 – Introduction

Chapter 1 is a brief description of the Electra Elite 48 system and contains a detailed list of equipment available with the system.

Chapter 2 – System Specifications

Chapter 2 contains detailed specifications for the Electra Elite 48 system and should be carefully reviewed by the technician ***before*** installing the system.

Chapter 3 – Hardware Requirements

Chapter 3 contains the hardware requirements for the Electra Elite 48 system and should be read by the technician ***before*** installing the system.

Chapter 4 – Installing the KSU

Chapter 4 contains the information necessary to install the KSU. The technician should become familiar with this section **before** starting installation.

Chapter 5 – Installing Electronic Telephone Units

Chapter 5 contains instructions for installing the ETUs in the KSU.

Chapter 6 – Installing Electra Elite Multiline Terminals

Chapter 6 describes each available terminal that can be used with the Electra Elite 48 system and provides installation instructions.

Chapter 7 – Installing Optional Equipment

Chapter 7 contains installation instructions for optional equipment that can be added to the system as customer business grows.

Chapter 8 – Installing *D*^{term} Series i Equipment

Chapter 8 describes each DTR terminal, the DCR console, and each adapter that is available to allow peripheral equipment to be attached to Multiline Terminals. Installation instructions are provided where necessary.

Chapter 9 – Installing Electra Professional Telephones

Chapter 9 contains instructions for installing Electra Professional terminals on the Electra Elite 48 system.

Chapter 10 – System Maintenance

Chapter 10 is a guide to help the technician troubleshoot and diagnose problems during and after system installation.

SUPPORTING DOCUMENTS

Other manuals in the set are described below.

Electra Elite 48/192 Features and Specifications Manual

This manual describes each available feature for the system.

Electra Elite 48 General Description Manual

This manual contains general information about the system features, configuration, and standards. This overview of the Electra Elite 48 system is useful when presenting information to potential customers.

Electra Elite 48/192 Programming Manual

This manual contains all programming instructions for the Electra Elite system.

Electra Elite Least Cost Routing Manual

This manual provides instructions for the service technician to program the customer system for least cost routing.

Electra Elite 48/192 Job Specifications Manual

This manual contains instructions for the service technician to install and maintain the Electra Elite 48/192 systems and includes the job specification worksheets. Completing the worksheets provides all system programming values and configuration information necessary for technicians to maintain the system.

Electra Elite Wireless System Manual

This manual describes the system and provides hardware installation and programming procedures for the Electra Elite Wireless Communication System (WCS).

Elite ACD Plus Installation Manual

This manual provides general information about the Elite ACD Plus features, installation procedures and feature programming. The NEC Elite ACD Plus is an Automatic Call Distribution card that supports up to 40 agents and 12 supervisors at one time.

Electra Elite IPK/Electra Elite System Administration Terminal End-User Manual

This manual describes the operation of the SAT End-User program for the Electra Elite Key Telephone system. This program is a user-friendly Windows application that allows the user to program and configure several features of the Electra Elite KTS from the PC environment.

Elite VoIP Gateway Card Installation Manual

This manual describes the IPT(4)/(8)-U10 ETU, an optional interface for the Electra Elite KTS, that can combine trunk and tie line calls into Voice over internet Protocol (VoIP) Gateway trunks.

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Regulatory Information

Regulatory Information

GENERAL INFORMATION

Established Federal Communications Commission (FCC) rules permit this telephone system to be directly connected to the telephone network. A jack is provided by the telephone company. Jacks for this type of customer provided equipment are not provided on party lines or coin lines.

When the telephone company makes changes in its technical operations and procedures that affect the compatibility or use of the Electra Elite system, it is required to give adequate notice of the changes.

COMPANY NOTIFICATION

Before connecting this telephone system to the telephone network, the following information must be provided to the telephone company:

1. Your telephone number.
2. FCC registration number:

   ☎ When the system is to be installed as a Key Function system (no dial access to Trunk Groups/Route Advance Blocks), use the following number:

   NIFMUL-43074-KF-E

   ☎ When the system is to be installed as a Multifunction system, use the following number:

   NIFMUL-43076-MF-E

   ☎ When the system is to be installed as a PBX System, use the following number:

   NIFMUL-43075-PF-E

   ☎ Ringer Equivalence Number (REN): **2.0B**

   ☎ USOC jack required: **RJ21X**

The Facility Interface Code (FIC), Ringer Equivalent Number (REN), Service Order Code (SOC), and Jack for each interface ETU are listed in the following table:

Table 1 FIC, REN, SOC, and Jack Types for Electra Elite System ETUs

Trunk/Station ETU Type	FIC	REN	SOC	Jack
BRT(4)-U( ) ETU	02IS5	N/A	6.0F	N/A
CAMA Trunk	02RV-O	0.7A	9.0F	RJ21X
COI(4)-U( ) ETU (Loop Start)	02LS2	0.7A	9.0F	RJ21X
COI(8)-U( ) ETU (Loop Start)	02LS2	0.7A	9.0F	RJ21X
COI(8)-U( )ETU (Ground Start)	02GS2	0.7A	9.0F	RJ21X
COIB(4)-U( ) ETU for COID/COI Mode (Loop Start)	02LS2	0.7A	9.0F	RJ21X
COIB(8)-U( ) ETU (Loop Start)	02LS2	0.7A	9.0F	RJ21X
COIB(4)-U( ) ETU for COI Mode (Ground Start)	02GS2	0.7A	9.0F	RJ21X
COID(4)/(8)-U( ) ETU (Loop Start)	02LS2	0.7A	9.0F	RJ21X
DID(4)-U( ) ETU	02RV2T	N/A	9.0F	RJ21X
DTI-U( ) ETU	04DU9-BN 04DU9-DN 04DU9-1KN 04DU9-1SN	N/A	6.0P	N/A
OPX(2)-U( ) ETU	0L13C	N/A	9.0F	RJ21X
PRT(1)-U( ) ETU	04DU9-1SN	N/A	6.0P	N/A
TLI(2)-U( ) ETU	TL31M	N/A	9.0F	RJ21X

INCIDENCE OF HARM

When the system is malfunctioning, it could cause harm to the telephone network. The telephone system should be disconnected until the problem is corrected. When this is not done, the telephone company may temporarily disconnect service.

RADIO FREQUENCY INTERFERENCE

In compliance with FCC Part 15 rules, the following statement is provided:

IMPORTANT NOTE

"This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the Installation Service Manual, may cause interference to radio communications. This equipment has been tested and approved for compliance with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, that provide reasonable protection against such interference when operated in a commercial environment. Operation of this telephone system in a residential area is likely to cause interference, in which case, the user, at his or her own expense, is required to take whatever measures may be required to correct the interference."

HEARING AID COMPATIBILITY

The NEC Multiline Terminals and NEC Single Line Telephones provided for this system are hearing aid compatible. The manufacturer of other Single Line Telephones for use with the system must provide notice of hearing aid compatibility to comply with FCC rules that prohibit the use of non-hearing aid compatible telephones.

DIRECT INWARD DIALING

Operating this equipment without providing proper answer supervision is a violation of Part 68 of the FCC rules.

Proper Answer Supervision occurs when:

- This equipment returns answer supervision to the Public Switched Telephone Network (PSTN) when Direct Inward Dialing (DID) calls are:
  - Answered by the called station.
  - Answered by the Attendant.
  - Routed to a recorded announcement that can be administered by the Customer Premise Equipment (CPE) user.
  - Routed to a dial prompt.
- This equipment returns answer supervision on all DID calls forwarded to the Public Switched Telephone Network (PSTN). Permissible exceptions are:
  - A call is unanswered.
  - A busy tone is received.
  - A reorder tone is received.

VOICE ANNOUNCEMENT/ MONITORING OVER DID LINES

CAUTION

The use of monitoring, recording or listening devices to eavesdrop, monitor, retrieve or record telephone conversations or other sound activities, whether or not contemporaneous with its transmission, may be illegal in certain circumstances under federal or state laws. Legal advise should be sought prior to implementing any practice that monitors or records any telephone conversation. Some federal and state laws require some form of notification to all parties to the telephone conversation, such as using a beep tone or other notification methods, or require the consent of all parties to the telephone conversation, prior to monitoring or recording a telephone conversation. Some of these laws incorporate strict penalties.

MUSIC ON HOLD

IMPORTANT NOTE

"In accordance with U.S. Copyright Law, a license may be required from the American Society of Composers, Authors and Publishers, or other similar organization, When radio or TV broadcasts are transmitted through the Music On Hold feature of this telecommunication system. NEC America Inc., hereby disclaims any liability arising out of the failure to obtain such a license."

SERVICE REQUIREMENTS

When equipment malfunctions, all repairs will be performed by NEC America, Inc. or by an authorized agent. The user must report the need for service to an NEC America, Inc. authorized agent or to NEC America, Inc.

UL REGULATORY INFORMATION

This equipment has been listed by Underwriters Laboratories and complies with all applicable requirements of the standard for telephone equipment UL 1459.

INDUSTRY CANADA REQUIREMENTS

Industry Canada has established rules that permit this telephone system to be directly connected to the telephone network. Prior to the connection or disconnection of this telephone system to or from the telephone network, the telephone company must be provided with the following information.

1. Your telephone number.

2. IC Certificate number: **140 7942 A**

3. Ringer Equivalence Number (REN) of the equipment: **2.1**

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements as prescribed in the applicable Terminal Equipment Technical requirements document(s). The Department does not guarantee that equipment operates to user satisfaction.

Before installation, the user should ensure that it is permissible to connect this equipment to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION

Users should not attempt to make such connections themselves, but should contact the applicable electric inspection authority, or electrician.

The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination of an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalent Numbers of all the devices does not exceed 5.

This equipment is listed by the Canadian Standards Association and complies with all applicable requirements of the standard for telephone equipment C 22.2 No. 225.

This equipment meets IC requirements CS03.

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as regulated in the radio interference regulations of Industry Canada.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de Classe A prescrites dans le reglement sur le brouillage radioelectrique edicte par Industrie Canada.

BATTERY DISPOSAL

The Electra Elite system includes the batteries listed below. When disposing of these batteries, KSU, and/or ETUs, you must comply with applicable federal and state regulations regarding proper disposal procedures.

Table 2 Battery Types and Quantities for KSUs and ETUs

Unit Name	Type of Battery	Quantity
B48-U10 KSU	Lead Acid	2
CTI/VP(4)/(8)/(12)/(16)-U( ) ETU	Lithium	1
DTP-1HM-1 TEL DTP-1HM-2 TEL	Lithium	1
DTP-16HC-1 TEL	Nickel-Cadmium	1
DTR-1HM-1 TEL	Lithium	1
DTR-4R-1 TEL	Nickel-Cadmium	1
DTU-4R-1 TEL	Lead Acid	1
ETW-4R-1 TEL	Nickel-Cadmium	1
FMS(2)/(4)/(8)-U( ) ETU	Nickel-Cadmium	1

Table 2 Battery Types and Quantities for KSUs and ETUs (Continued)

MBD-U( ) Unit	Nickel-Cadmium	1
MIFA-U( ) ETU	Nickel-Cadmium	1
MIFM-U( ) ETU	Nickel-Cadmium	1
VMS(2)/(4)/(8)-U( ) ETU	Nickel-Cadmium	1

The Electra Elite 48 MBD-U10 Unit provides memory backup for approximately 21 days. The Ni-Cd battery should be replaced about every two years.

IMPORTANT SAFEGUARDS FOR BATTERY DISPOSAL

DO NOT PLACE USED BATTERIES IN YOUR REGULAR TRASH! THE PRODUCT YOU PURCHASED CONTAINS A NICKEL-CADMIUM OR SEALED LEAD BATTERY. NICKEL-CADMIUM OR SEALED LEAD BATTERIES MUST BE COLLECTED, RECYCLED, OR DISPOSED OF IN AN ENVIRONMENTALLY SOUND MANNER.

The incineration, landfilling or mixing of nickel-cadmium or sealed lead batteries with the municipal solid waste stream is PROHIBITED BY LAW in most areas. Contact your local solid waste management officials for other information regarding the environmentally sound collection, recycling, and disposal of the battery.

Nickel-Cadmium (or sealed lead) batteries must be returned to a federal or state approved nickel-cadmium (or sealed lead) battery recycler. This may be where the batteries were originally sold or a local seller of automotive batteries. Contact your local waste management officials for other information regarding the environmentally sound collection, recycling and disposal of the battery contained in this product. For Ni-Cd batteries, you can also call 1-800-8-BATTERY^{SM} if further information is required.

The packaging for the Electra Elite system contains the following labels regarding proper disposal.

PRODUCT PACKAGE LABELING

Ni-Cd

CONTAINS NICKEL-CADMIUM BATTERY. BATTERY MUST BE RECYCLED OR DISPOSED OF PROPERLY. MUST NOT BE DISPOSED OF IN MUNICIPAL WASTE.

Pb

CONTAINS SEALED LEAD BATTERY. BATTERY MUST BE RECYCLED. MUST NOT BE DISPOSED OF IN MUNICIPAL WASTE.

Ni-MH

CONTAINS NICKEL-METAL HYDRIDE BATTERY. BATTERY MUST BE RECYCLED OR DISPOSED OF PROPERLY. MUST NOT BE DISPOSED OF IN MUNICIPAL WASTE.

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Introduction

CHAPTER 1

SECTION 1 GENERAL INFORMATION

1.1 Unique Design

The Electra Elite 48 system is a powerful key system that meets the ever changing business communications demands of today. Unique compact design allows it to be easily and quickly installed.

Electra Elite 48 is a feature-rich system that provides telephone functions and supports advanced features such as:

- Automatic Number Indication (ANI)/Caller ID
- Automatic Route Selection (ARS)
- Caller ID Call Return
- Centralized Voice Mail
- Computer Telephony Integration (CTI)
- Dialed Number Indication Service (DNIS)
- D^{term} Analog Cordless Terminal
- D^{term} Cordless II Terminal
- D^{term} Cordless Lite Terminal
- D^{term} Handset Cordless Terminal
- Elite ACD Plus
- Emergency 911 – Cut through
- Enhanced 911
- Integrated Digital Voice Mail
- ISDN-BRI and PRI Voice Trunks
- K-CCIS Common Channel Interoffice Signaling
- LAN/KTS Cabling Integration
- Least Cost Routing (LCR)
- Live Monitoring
- Live Record
- Multiline Conference Bridge
- Multilingual LCD Indication
- Multiple Music on Hold using CO Interface

- PC Attendant Console
- Unified Messaging
- Uniform Call Distribution (UCD)
- Voice over Internet Protocol (VoIP)
- Wireless
- Optional 33.6 kbps Modem for Remote Programming and Maintenance

The Electra Elite 48 system offers a variety of compatible Multiline Terminals that are available in 8-line, 16-line, and 32-line capacities and offered as display and non-display terminals. A 2-line non-display terminal, 60-line Attendant Console, and a variety of cordless terminals are also available.

A customer with existing Electra Professional terminals can easily connect them to the Electra Elite 48 system to provide inexpensive migration. Most Electra Elite 48 system features are available with the Electra Professional Multiline Terminals.

The Electra Elite 48 system supports a wide range of additional equipment including Single Line Telephones, external speakers, facsimile machines, external microphones, and headsets that can be connected to the system to accommodate individual customer needs. Figure 1-1 System Configuration Example shows a system with standard and optional equipment (some locally provided).

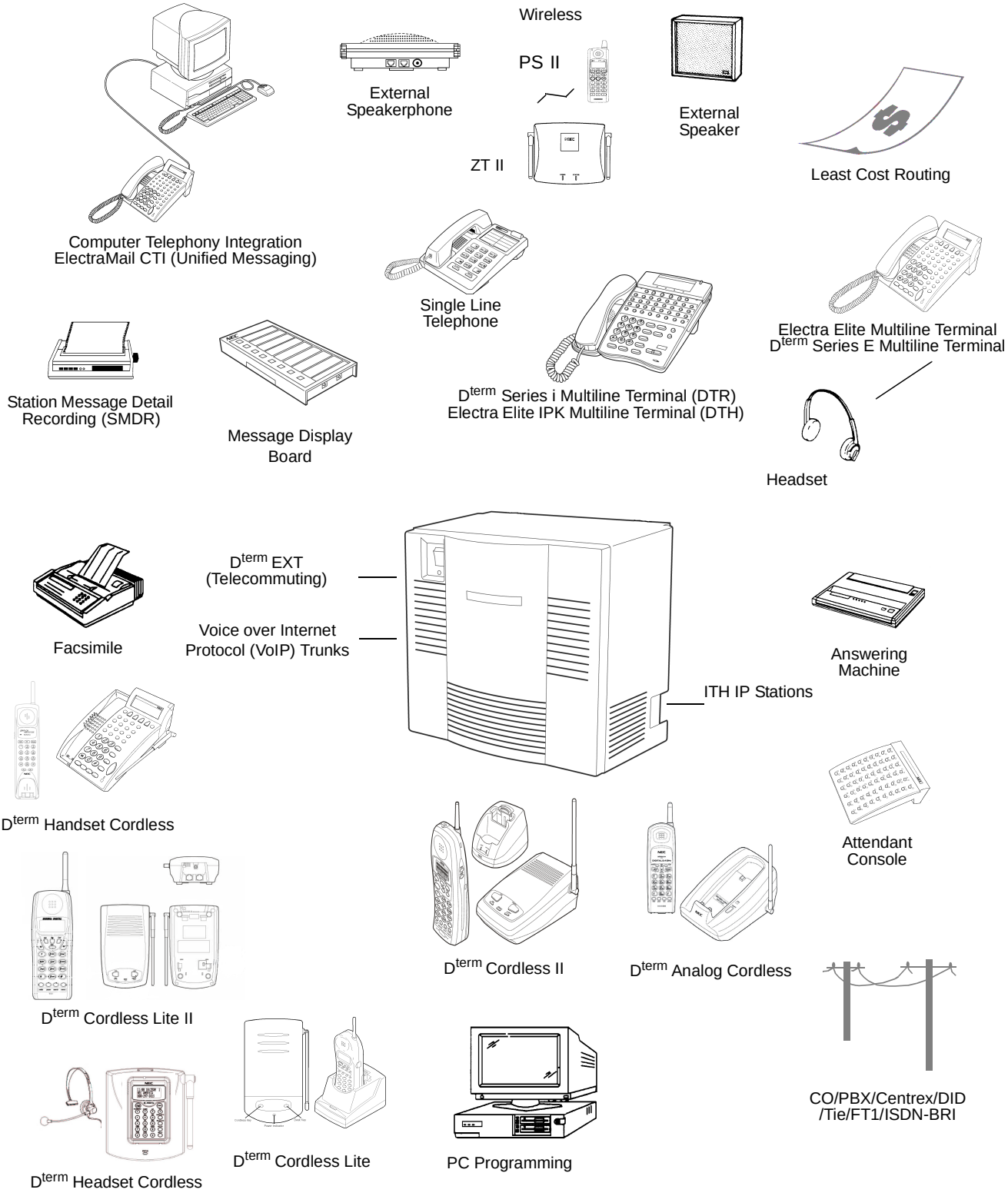


Figure 1-1 System Configuration Example

SECTION 2 EQUIPMENT DESCRIPTION

2.1 Equipment List

The following table lists all equipment used with the Electra Elite 48 system. The equipment name, a description of the equipment, and the KSU quantities allowed for each unit are included. The list is arranged alphabetically by category.

☞ The following maximum values are based on the assumption that at least one Electronic Station Interface ETU and one Trunk Interface ETU are installed

Equipment Name	Description	KSU Maximum Quantities
Key Service Units, Power Supply Units, and Adapters		
B48-U10 KSU	The Basic Key Service Unit (KSU) for the Electra Elite System provides service for outside lines, Attendant Consoles, and interconnection of the station terminals. The basic KSU provides 48 ports. The B48-U10 KSU provides seven slots. Slot 1 is an ESI card that is built-in on the MBD-U10 Unit. Slot S2 is the ISA slot. Slots S3~S6 are interface slots with MDF connections. Slots S2 and S7 have no MDF connections and may be used for ETUs that do not require MDF connections (*e.g.*, MIFM, PBR, VRS, or VMS). The P64-U10 PSU (power supply unit), backup batteries, one PFT connection, and one external zone paging connection are included with each KSU.	1 per system
P64-U10 PSU	The Power Supply Unit is included with the B48-U10 KSU.	1 per system
Common Electronic Telephone Units		
CLKG-U( ) Unit	The Clock Unit provides synchronization for FT1, ISDN Basic Rate, and ISDN Primary Rate connections. The unit is mounted on the MBD-U10 Unit in the B48-U10 KSU and supports the DTI-U( ), BRT(4)-U( ), PRT(1)-U( ), and BSU(2)-U( ) ETUs.	1 per system with FT1, ISDN-BRI, ISDN-PRI or Wireless connections
KMM(1.0)U	This unit is installed on the MIFM-U( ) ETU and adds LCR and Caller ID scrolling and dialing features.	1 per MIFM-U( ) ETU

Equipment Name	Description	KSU Maximum Quantities
MBD-U10 Unit	The MBD-U10 Unit contains a 32-bit microprocessor that has overall control of the system. This ETU communicates with the interface boards and supports up to 48 ports (five interface cards). The first IF slot (S1) is built-in on this board and is designated as an ESI(8).	1 MBD per system 4 PBR circuits 16 voice mail ports (analog) 24 voice mail ports (digital) 48 ports 7 slots 32 Station Ports 1 Power Failure Transfer 16 Trunks 32 PC Telephony Boards 16 Conference Circuits 1 built-in External Paging connection
MIFA-U( ) ETU	This unit provides additional memory for processing and backup for UCD. This ETU must be installed in slot S2. ☞ Electra Stat ACD feature is not supported using the MIFA-U( ) ETU with KMA.	1 MIFA-U( ) ETU
MIFM-U( ) ETU	This Unit provides additional memory for PC programming and SMDR, LCR Caller ID scrolling, or Wireless programming. This ETU must be installed in slot S2. When the LCR Caller ID Scroll functions are desired, the KMM(1.0)U must be installed.	1 MIFM-U( ) ETU
Modem Kit Unit	The modem unit is installed on the PCT(S)-U( ) Unit or MIFM-U( ) ETU.	1 per system
Trunk Electronic Telephone Units		
BRT(4)-U10/20 ETU	This Basic Rate Interface unit provides four channels (eight voice channels) for ISDN Basic Rate Interface. Caller ID is supported. This ETU is installed in slot S3 or S4 in the B48-U10 KSU (**S7000 or lower**). **Using S8000 or higher**, This ETU can be installed in slots S3~S6 in the B48-U10 KSU. The maximum number depends on other Trunk cards installed. This ETU shares the total number of CO/PBX lines in the system. **A CLKG-U( ) Unit must be installed.**	2 ETUs (16 B Channels)

Equipment Name	Description	KSU Maximum Quantities
COI(4)-U( ) ETU	Electrical fuses (posistors) are built into this ETU. This unit supports four outside (CO/PBX) lines and provides circuitry for ring detection, holding, and dialing. The outside lines must be Loop Start DTMF trunks. This ETU is installed in slots S3~S6 in the B48-U10 KSU. This ETU can provide an E911 CAMA trunk. The maximum number depends on other Trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.	4 ETUs 16 CO/PBX lines
COI(8)-U( ) ETU	Electrical fuses (posistors) are built into this ETU. This unit supports eight outside (CO/PBX) lines and provides circuitry for ring detection, holding, and dialing. The outside lines can be any combination of Loop Start or Ground Start DTMF trunks. This ETU is installed in slots S3~S6 in the B48-U10 KSU. This ETU can provide an E911 CAMA trunk. The maximum number depends on other Trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.	2 ETUs 16 CO/PBX lines
COIB(4)-U10 ETU	This ETU can function the same as the COI(4)-U( ) or COID(4)-U( ) ETU to provide Central Office interface. When ETU is set for COID mode, Loop Start trunks and/or Caller ID trunks are supported. When the ETU is set for COI mode, Loop Start or Ground Start is supported. Caller ID is **not** supported in COI mode. Connections for Ground Start trunks are polarity sensitive. Only DTMF signaling is supported. This ETU can provide an E911 CAMA trunk. For COID mode: Caller ID trunks must be installed in slot S3 or S4 (**S7000 or lower**). For COID mode (**S8000 or higher**): Caller ID trunks can be installed in slots S3~S6. The maximum number depends on other Trunk cards installed. This ETU shares the total number of CO/PBX lines in the system. Tip and RIng electrical fuses are provided to comply with UL 1459 requirements.	COI Mode 4 ETUs 16 CO/PBX lines COID Mode 2 ETUs 16 CO (Class) lines, (**S8000 or higher)**

Equipment Name	Description	KSU Maximum Quantities
COIB(4)-U20/30 ETU	This ETU can function the same as the COI(4)-U( ) or COID(4)-U( ) ETU to provide Central Office interface. This ETU has transmit and receive pad controls. Only the COIB(4)-U30 ETU can support the CO Message Waiting Indication feature **(S9500)**. When ETU is set for COID mode, Loop Start trunks and Caller ID trunks are supported. When the ETU is set for COI mode, Loop Start is supported. **Ground Start Trunks are not supported**. Caller ID is **not** supported in COI mode. Fax CO Branch support is provided on port 4 only. Only DTMF signaling is supported. This ETU can provide an E911 CAMA trunk on port 3 only. For COI mode: ETUs can be installed in slots S3~S6. For COID mode:Two Caller ID ETUs must be installed in slot S3 or S4 (**S7000 or lower**). For COID mode (**S8000 or higher**): Four Caller ID ETUs can be installed in slots S3~S6. The maximum number depends on other Trunk cards installed. This ETU shares the total number of CO/PBX lines in the system. Tip and RIng electrical fuses are provided to comply with UL 1459 requirements.	COI Mode 4 ETUs COID Mode 4 ETUs **S8000 or higher)**
COIB(8)-U20/30 ETU	This ETU can function the same as the COI(8)-U( ) or COID(8)-U( ) ETU to provide Central Office interface. Only the COIB(8)-U30 ETU can support the CO Message Waiting Indication feature **(S9500)**. When ETU is set for COID mode, Loop Start trunks and Caller ID trunks are supported. When the ETU is set for COI mode, Loop Start is supported. **Ground Start Trunks are not supported**. Caller ID is **not** supported in COI mode. Fax CO Branch is not supported. Only DTMF signaling is supported. This ETU can provide an E911 CAMA trunk on port 3 or 7. For COI mode, ETUs can be installed in slots S3~S6. For COID mode: One Caller ID ETU must be installed in slot S3 or S4 (**S7000 or lower**). For COID mode (**S8000 or higher**): Two Caller ID ETUs can be installed in slots S3~S6. The maximum number depends on other Trunk cards installed. This ETU shares the total number of CO/PBX lines in the system. Tip and RIng electrical fuses are provided to comply with UL 1459 requirements.	COI Mode 2 ETUs COID Mode 2 ETU

Equipment Name	Description	KSU Maximum Quantities
COID(4)-U( ) ETU	The Central Office Caller ID ETU detects Caller ID signals from the central office and sends caller identification to the MBD-U10 Unit. Electrical fuses (posistors) are built into this ETU. This unit provides loop start DTMF trunks only and supports four outside (CO/PBX) lines. The unit provides circuitry for ring detection, holding, and dialing. This ETU is installed in slot S3 or S4 in the B48-U10 KSU (**S7000 or lower**). For COID mode (**S8000 or higher**): Caller ID trunks can be installed in slots S3~S6. This ETU can provide an E911 CAMA trunk. The maximum number depends on other Trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.	2 ETUs 8 CO (Class) lines
COID(8)-U( ) ETU	The Central Office Caller ID ETU detects Caller ID signals from the central office and sends caller identification to the MBD-U10 Unit. Electrical fuses (posistors) are built into this ETU. This unit provides loop start DTMF trunks only and supports eight outside (CO/PBX) lines. The unit provides circuitry for ring detection, holding, and dialing. This ETU is installed in slots S3 or S4 in the B48-U10 KSU (**S7000 or lower**). For COID mode (**S8000 or higher**): Caller ID trunks can be installed in slots S3~S6. This ETU can provide an E911 CAMA trunk. The maximum number depends on other Trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.	2 ETUs 16 CO (Class) lines
DID(4)-U( ) ETU	The Direct Inward Dialing Interface Unit supports up to four DID or four 2-way DID lines. Each DID(4)-U( ) ETU requires one interface slot position in the KSU. ☞ Immediate, wink start, second dial tone, and delay start signaling can be combined on this ETU. This ETU is installed in slots S3~S6 in the B48-U10 KSU. The maximum number depends on other Trunk cards installed. These ETUs share the total number of CO/PBX lines in the system.	4 ETUs 16 DID Trunks

Equipment Name	Description	KSU Maximum Quantities
DTI-U( ) ETU (**S7000 or lower**)	The Digital Trunk Interface ETU terminates Fractional T1 (16 DS-0 channels) lines. This ETU contains circuitry for outside ring detection, holding, dialing, control function, Tie line (E&M), and DID signaling. Only the DTI-U30 ETU supports K-CCIS common channel signaling. Automatic Number Indication (ANI) is supported. A combination of Loop Start and Ground Start trunks, DID trunks, or Tie lines can be used on the ETU. Each trunk is assigned in groups of four. DTMF or Dial Pulse dialing is supported. This ETU is installed in slot S4 in the B48-U10 KSU. The maximum number depends on other Trunk cards installed. This ETU shares the total number of CO/PBX lines. ☞ DTI-U( ) ETU and PRT(1)-U( ) ETU cannot be used in the same system. **A CLKG-U( ) Unit must be installed.**	1 ETU 16 lines
DTI-U( ) ETU (**S8000 or higher**)	This ETU can installed in slots S3~S6 in the B48-U10 KSU.	4 ETUs 16 Lines
IPT(4)-U( ) ETU	This IP Gateway ETU is an optional Interface that can combine trunk calls into Gateway trunks. This ETU can emulate the following ETUs: TLI(2)-U( ), DID(4)-U( ), COI(4)/(8)-U( ), or COID(4)/(8)-U( ). Refer to the applicable ETU assignment for the trunk capacity. This ETU can be installed in KSU slots that support the applicable assigned ETU. The maximum number depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system. This ETU also shares the total number of station ports in the system.	4 ETUs Variable IP Gateway Trunks 16 lines
IPT(8)-U( ) ETU	This IP Gateway ETU is an optional Interface that can combine trunk calls into Gateway trunks. This ETU can emulate the following ETUs: TLI(2)-U( ), DID(4)-U( ), COI(4)/(8)-U( ), or COID(4)/(8)-U( ). Refer to the applicable ETU assignment for the trunk capacity. This ETU can be installed in KSU slots that support the applicable assigned ETU. The maximum number depends on other trunk cards installed. This ETU shares the total number of CO/PBX lines in the system. This ETU also shares the total number of station ports in the system.	4 ETUS Variable IP Gateway Trunks 32 lines

Equipment Name	Description	KSU Maximum Quantities
PRT(1)-U( ) ETU (**S7000 or lower**)	The Integrated Service Digital Network (ISDN) - Primary Rate Interface (PRI) is a Public Switched Telephone Network (PSTN) service that provides 16B channels and a D channel (15B + D) for voice call trunking. The B channels have 15 CO/PBX connections. Caller ID is supported. This ETU is installed in slot S4 in the B48-U10 KSU. The maximum number depends on other Trunks installed. This ETU shares the total number of CO/PBX lines in the system. ☞ PRT(1)-U( ) and DTI-U( ) cannot be used in the same system. **A CLKG-U( ) Unit must be installed.**	1 ETU 16 lines
PRT(1)-U( ) ETU (**S8000 or higher**)	This ETU can be installed in slots S3~S6 in the B48-U10 KSU.	4 ETUs 16 Lines
TLI(2)-U( ) ETU	The Tie Line Interface ETU supports the termination and operation of up to two E&M Tie lines (4-wire, type I and type V, and 10/20 pps Dial Pulse or DTMF). ☞ Immediate, wink start, second dial tone, and Delay dial signaling can be combined on this ETU. This ETU is installed in slots S3~S6 in the B48-U10 KSU. The maximum number depends on other Trunk cards installed. This ETU shares the total number of CO/PBX lines in the system.	4 ETUs 8 Tie lines
Station Electronic Telephone Units		
CMS(2)/(4)-U( ) ETU	This ETU is a digital voice mail system that supports a maximum of four ports. Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.	1 ETU per system
CNF(8)-U( ) ETU	The Multiline Conference Bridge feature allows any intercom user or any outside party calling a port of the CNF(8)-U( ) to join or make a multiparty conference call. This ETU supports one 8-party conference or two 4-party conferences regulated by a switch setting. This ETU is installed in slots S2~S7 in the B48-U10 KSU. The system recognizes this ETU as SLI(8)-U( ) ETU. This ETU shares the total number of station ports in the system.	2 ETUs (16 Conference Ports)

Equipment Name	Description	KSU Maximum Quantities
CTI/VP(4)/(8)/(12)/(16)-U( ) ETU	This ETU is a 4-, 8-, 12-, or 16-port Digital Voice Mail system with ports that can support TeLANophy, inbound/outbound faxing, and Hospitality/HVM applications. It can be installed in one of the S2~S7 interface slots. Slot S7 is recommended. This ETU shares the total number of station ports in the system. Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.	1 ETU
DPH(4)-U( ) ETU	The Doorphone interface ETU allows four DP-D-1A Doorphones to be connected. Two simultaneous calls are allowed, and four Door Lock Release relays are provided. This ETU is installed in slots S3~S6 in the B48-U10 KSU.	1 ETU
ESI(8)-U( ) ETU	The Electronic Station Interface ETU contains eight circuits. Each circuit can support any Attendant Console, Multiline Terminal, or Single Line Telephone adapter. This ETU is installed in slots S3~S6 in the B48-U10 KSU. The first ESI(8)-U( ) ETU is built in on the MBD-U10 Unit of the B48-U10 KSU and designated as Slot 1 (Ports 01~08). The maximum number depends on other Station cards installed. This ETU shares the total number of station ports in the system.	3 ETUs 32 Extensions
FMS(2)/(4)/(8)-U( ) ETU	This ETU is installed in one of the S2~S7 interface slots. It has two, four, or eight channels of built-in Voice Mail. The system recognizes this ETU as VMS(4)/(8)-U( ) ETU. Slot S7 is the recommended slot for installation. This ETU shares the total number of station ports in the system. Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.	1 ETU
OPX(2)-U( ) ETU	The Off-Premise Extension ETU provides for the termination and operation of a maximum of two off-premise extensions. Each ETU has a built-in ringer (RSG). Up to 1600 ohms of loop resistance (including the Single Line Instrument) is acceptable between the OPX ETU and the Single Line Telephone. This ETU is installed in slots S3~S6 in the B48-U10 KSU. This ETU shares the total number of station ports in the system.	3 ETUs 6 extensions
SLI(4)-U( ) ETU	The Single Line Interface ETU supports a maximum of four Single Line Telephones and/or analog voice mail ports. This ETU provides Ringing Signal Generator (RSG) and Message Waiting (MW) LED voltage to Single Line Telephones. This ETU is installed in slots S3~S6 in the B48-U10 KSU. The maximum number depends on other station cards installed. This ETU shares the total number of station ports.	4 ETUs 16 ports

Equipment Name	Description	KSU Maximum Quantities
SLI(8)-U( ) ETU	The Single Line Interface ETU supports a maximum of eight Single Line Telephones and/or voice mail ports. This ETU provides Ringing Signal Generator (RSG) and Message Waiting (MW) LED voltage to Single Line Telephones. This ETU is installed in slots S3~S6 in the B48-U10 KSU. The maximum number depends on other station cards installed. This ETU shares the total number of station ports.	3 ETUs 24 ports
VMS(2)-U( ) ETU	This ETU is installed in one of the S2~S7 interface slots. It has two channels of built-in Voice Mail. Slot S7 is recommended for installation. This ETU shares the total number of station ports in the system. Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.	1 VMS(2)/(4)/(8)-U( ) ETU
VMS(4)-U( ) ETU	This ETU is installed in one of the S2~S7 interface slots. It has four channels of built-in Voice Mail. Slot S7 is recommended for installation. This ETU shares the total number of station ports in the system. Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.	
VMS(8)-U( ) ETU	This ETU is installed in one of the S2~S7 interface slots. It has eight channels of built-in Voice Mail. Slot S7 is recommended for installation. This ETU shares the total number of station ports in the system. Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.	
Optional Electronic Telephone Units		
ACD(8)-U( ) ETU	The Automatic Call Distribution ETU interfaces the Elite ACD Plus Server with the Electra Elite KSU. This ETU is installed in one of the S2~S7 interface slots. Slot S6 is recommended.	1 ETU
BSU(2)-U( ) ETU	The Base Station Unit ETU interfaces the KSU with the ZT II Zone Transceiver for wireless communication with a PS II Personal Station. This ETU is installed in slots S3~S6 in the B48-U10 KSU. **A CLKG-U( ) Unit must be installed.**	3 ETUs
CCH(4)-U( ) ETU	The Common Channel Handler furnishes four K-CCIS routes to coordinate receiving common channel data from a distant system or to coordinate sending it to a distant system using Tie Lines.	1

Equipment Name	Description	KSU Maximum Quantities
ECR-U( ) ETU	The External Control Relay ETU provides common audible tone signaling using relay contacts for external ringing equipment and an audible output for external paging systems. Four External Tone Ringer Control relays, one Night Chime relay, three External Paging relays, and two General Purpose relays are provided. This ETU is installed in slots S3~S6 in the B48-U10 KSU.	1 ETU
HUB(8)-U( ) ETU	This ETU is an optional Ethernet Interface for Electra Elite that supports eight Ethernet Ports. Each port has two indicators that indicate status and activity. The HUB is a switching point for data from individual ports. A switch regulates transmission and detemines the prort where data should be forwarded.	1 ETU
IAD(8)-U( ) ETU	This ETU is an optional interface integration device that supports various IP applications such as IP CCH and MEGACO station.	1 ETU
IPCA( )-U( ) ETU	This ETU is a pure IP switch that can manage call control for 30 IP software telephones. The MG(8)-U( ) ETU is required for IP telephones to communicate with existing telephones or various avaliable trunks.	1 ETU
IVR(8)-U( ) ETU	This ETU is an eight-port system that supports IVR applications. Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.	1 ETU
MG(8)-U(ETU)	This ETU is an eight-path gateway ETU between the IPCA( )-U( ) ETU and the CPUB( )-U( ) ETU.	1 ETU
PBR( )-U( ) ETU	The Push Button Receiver ETU detects and translates DTMF tones generated by Single Line Telephones, modems, or facsimile machines. The PBR provides four circuits for Single Line Telephones only. This ETU is installed in slots S2~S7 in the B48-U10 KSU. ☞ Four PBR circuits are built into the MBD-U10 Unit.	1 ETU
VRS(4)-U( ) ETU	The Voice Recording Service ETU provides voice recording messages for internal stations, automatic answering on incoming outside calls, Delay Announcement messages for UCD by a voice recorded message, and receives DTMF tones. This ETU is installed in slots S2~S7 in the B48-U10 KSU.	2 ETUs
Terminals		
DCR-60-1 CONSOLE	This Attendant Console has 60 programmable line keys (each with two LEDs). Twelve keys can be programmed as Feature Access keys and 48 keys can be programmed as Direct Station Selection or outside line keys.	4
DCU-60-1 CONSOLE	This Attendant Console has 60 programmable line keys (each with two LEDs). Twelve keys can be programmed as Feature Access keys and 48 keys can be programmed as Direct Station Selection or outside line keys.	4

Equipment Name	Description	KSU Maximum Quantities
DP-D-1A	This Doorphone may be used when DPH(4)-U( ) ETU is installed.	4
DTP-1-1 TEL DTP-1-2 TEL	This Single Line Telephone is a fully modular terminal with a flash key, Redial key, 3-level receive volume control, 2-level ring volume control, data jack, and message waiting lamp. Each terminal requires a SLI(4)-U( ) ETU or a SLI(8)-U( ) ETU or SLT(1)-U( ) ADP.	24
DTR-1-1 TEL	This Single Line Telephone is a fully modular terminal with a flash key, Redial key, 6-level receive volume control, 4-level ring volume control, 3-tone ring pitch, data jack, and message waiting lamp. Each terminal requires a SLI(4)-U( ) ETU or a SLI(8)-U( ) ETU or SLT(1)-U( ) ADP.	24
DTP-1HM-1 TEL DTP-1HM-2 TEL	This Single Line Telephone is a fully modular terminal with a flash key, Redial key, 3-level receive volume control, 2-level ring volume control, data jack, message waiting lamp, and eight programmable Feature/Speed Dial keys. Each terminal requires an SLI(4)-U( ) ETU, SLI(8)-U( ) ETU or SLT(1)-U( ) ADP.	24
DTR-1HM-1 TEL	This Single Line Telephone is a fully modular terminal with a flash key, Speaker key, Hold key, Redial key, 6-level receive and speaker volume control, 4-level ring volume control, 3-tone ring pitch, data jack, message waiting lamp, and eight programmable Feature/Speed Dial keys. Each terminal requires an SLI(4)-U( ) ETU, SLI(8)-U( ) ETU or SLT(1)-U( ) ADP.	24
DTP-2DT-1 TEL	This terminal is a fully modular terminal with two Flexible Line keys (each with 2-color LED), eight function keys, built-in speakerphone, and a large LED to indicate incoming calls and messages. Each terminal requires an ESI(8)-U( ) ETU station port. ☞ This terminal does not support any adapters.	31
DTR-2DT-1 TEL	This terminal is a fully modular terminal with two Flexible Line keys (each with 2-color LED), nine function keys, built-in speakerphone, a large LED to indicate incoming calls and messages, and an Analog SLT Port (outgoing only). Each terminal requires an ESI(8)-U( ) ETU station port. ☞ This terminal does not support any adapters.	31
DTU-4R-1 TEL	This D^{term} Cordless Lite Terminal can be connected to the Electra Elite System using a tandem connection to a Multiline Terminal. The terminal has a 16-digit, 2-line LCD, dial pad, talk key, chan key, hold key, transfer key, conf key, mute key, vol key, a msg icon, vibrator, and four function keys with red LEDs. The cordless terminal can be switched to the Multiline Terminal connected to it by pressing the Desk key on the base unit of the idle D^{term} Cordless Lite Terminal.	30

Equipment Name	Description	KSU Maximum Quantities
DTP/DTU-8-1 TEL	This digital Multiline Terminal has eight programmable line keys (each with a 2-color LED), built-in speakerphone, a Large LED to indicate incoming calls and messages, headset jack, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C)-U, CTU(S)-U, or HFU-U Unit.	31
DTH-8-1 TEL DTR-8-1 TEL	This digital Multiline Terminal has eight programmable line keys (each with a 2-color LED), nine function keys, built-in speakerphone, a Large LED to indicate incoming calls and messages, headset jack, and compatibility with AD(A)-R, AP(A)-R, AP(R)-R, or CT(A)-R Unit. A Directory button allows Caller ID scrolling, and a Message button allows direct access to voice mail.	31
DTP-8D-1 TEL DTU-8D-2 TEL	This digital Multiline Terminal has eight programmable line keys (each with a 2-color LED), built-in speakerphone, a Large LED to indicate incoming calls and messages, headset jack, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C)-U, CTU(S)-U, or HFU-U Unit. This terminal is also equipped with a 24-character, 3-line, adjustable Liquid Crystal Display (LCD) and four softkeys.	32
DTH-8D-1 TEL DTR-8D-1 TEL	This digital Multiline Terminal has eight programmable line keys (each with a 2-color LED), nine function keys, built-in speakerphone, a Large LED to indicate incoming calls and messages, headset jack, and compatibility with AD(A)-R, AP(A)-R, AP(R)-R, or CT(A)-R Unit. A Directory button allows Caller ID scrolling, and a Message button allows direct access to voice mail. This terminal is also equipped with a 24-character, 3-line, adjustable Liquid Crystal Display (LCD) and four softkeys.	32
DTP-16HC-1 TEL	This D^{term} Handset Cordless Terminal is a stand-alone telephone with direct connection to a single port on the ESI(8)-U( ) ETU. An ACA-U Unit adapter is required for this terminal. Each terminal requires an ESI(8)-U( ) ETU port.	24
DTP/DTU-16-1 TEL	This digital Multiline Terminal has 16 programmable line keys (each with a 2-color LED), a built-in speakerphone, a Large LED to indicate incoming calls and messages, headset jack, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C)-U, CTU(S)-U, or HFU-U Unit.	31
DTP-16D-1 TEL DTU-16D-2 TEL	This digital Multiline Terminal has 16 programmable line keys (each with a 2-color LED), a built-in speakerphone, a Large LED to indicate incoming calls and messages, headset jack, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C)-U, CTU(S)-U, or HFU-U Unit. This terminal also has a 24-character, 3-line, adjustable Liquid Crystal Display (LCD) and four softkeys.	32

Equipment Name	Description	KSU Maximum Quantities
DTH-16D-1 TEL DTR-16D-1 TEL	This digital Multiline Terminals have 16 programmable line keys (each with a 2-color LED), nine function keys, a built-in speakerphone, a Large LED to indicate incoming calls and messages, headset jack, and compatibility with AD(A)-R, AP(A)-R, AP(R)-R, or CT(A)-R Unit. A Directory button allows Caller ID scrolling, and a Message button allows direct access to voice mail. This terminal also has a 24-character, 3-line, adjustable Liquid Crystal Display (LCD) and four softkeys.	32
DTP/DTU-32-1 TEL	This digital Multiline Terminal has 32 programmable line keys (each with a 2-color LED), a built-in speakerphone, a Large LED to indicate incoming calls and messages, headset jack, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C)-U, CTU(S)-U, or HFU-U Unit.	31
DTP-32D-1 TEL DTU-32D-2 TEL	This digital Multiline Terminal is equipped with 32 programmable line keys (each with a 2-color LED), a built-in speakerphone, a Large LED to indicate incoming calls and messages, headset jack, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C)-U, CTU(S)-U, or HFU-U Unit. This terminal has a 24-character, 3-line, adjustable Liquid Crystal Display (LCD) and four softkeys.	32
DTH-32D-1 TEL DTR-32D-1 TEL	This digital Multiline Terminal is equipped with 32 programmable line keys (each with a 2-color LED), nine function keys, a built-in speakerphone, a Large LED to indicate incoming calls and messages, headset jack, and compatibility with AD(A)-R, AP(A)-R, AP(R)-R, or CT(A)-R Unit. A Directory button allows Caller ID scrolling, and a Message button allows direct access to voice mail. This terminal has a 24-character, 3-line, adjustable Liquid Crystal Display (LCD) and four softkeys.	32
D^{term} PS II	The Personal Station wireless terminal provides the features and benefits of a desktop telephone without the inconvenience of having to remain close to the desktop.	24
DTR-1R-1 TEL	The D^{term} Analog Cordless terminal uses 2.4 GHz Digital Spread Spectrum (DSS) Technology and is connected to an analog port using SLI(4)/(8)-U( ) or OPX(2)-U( ) ETU, an SLT(1)-U( ) ADP, or an APR-U Unit connected to the Multiline Terminal. This terminal does not have an LCD display.	20
DTR-4R-1 TEL	The D^{term} Cordless II terminal uses 900 MHz Digital Spread Spectrum (DSS) Technology and is connected in tandem to a Multiline Terminal. This terminal can be switched between cordless and the Multiline Terminal connected to it using a key on the base unit. This terminal has a 16-digit by 2-line LCD Display.	10

Equipment Name	Description	KSU Maximum Quantities
ETW-4R-1 TEL	This D^{term} Cordless Terminal can be connected to the Electra Elite System using a tandem connection to a Multiline Terminal. The terminal has a cordless handset, a 10-digit, 2-line LCD, dial pad, TALK key, HOLD key, TRF key, CNF key, SPD key, a MSG LED, optional vibrator, and four function keys with red LEDs. This D^{term} Cordless Terminal can be switched to the Multiline Terminal connected to it by pressing the DESK key on the base unit of the idle D^{term} Cordless Terminal.	9
ETW-8-1/2 TEL	This terminal is a fully modular instrument with tilt stand, eight Flexible Line keys (each with 2-color LED), eight function keys, built-in speakerphone, ADA compatibility, and a large LED to indicate incoming calls and messages.	31
ETW-16DC-1/2 TEL	This terminal is a fully modular instrument with tilt stand, 16 Flexible Line keys (each with 2-color LED), eight function keys, built-in speakerphone, ADA compatibility, and a large LED to indicate incoming calls and messages. This terminal has a 16-character by 2-line Liquid Crystal Display (LCD).	32
ETW-16DD-1/2 TEL	This terminal is a fully modular instrument with tilt stand, 16 Flexible Line keys (each with 2-color LED), eight function keys, 20 programmable One-Touch keys with red LEDs, built-in speakerphone, ADA compatibility, and a large LED to indicate incoming calls and messages. This terminal has a 16-character by 2-line Liquid Crystal Display (LCD).	32
ETW-24DS-1/2 TEL	This terminal is a fully modular instrument with tilt stand, 24 Flexible Line keys (each with 2-color LED), eight function keys, 12 programmable One-Touch keys, dual-path ability, built-in speakerphone, ADA compatibility, and a large LED to indicate incoming calls and messages. This terminal has a 16-character by 2-line Liquid Crystal Display (LCD).	32
EDW-48-1/2 DSS/BLF	This console has a tilt stand, 48 programmable keys with dual LEDs (green and red) and 12 function keys with red LED. All 48 keys can be assigned as DSS keys, outside line keys, or function keys.	4
Adapters and Optional Units		
AC-R Unit	The AC Adapter unit connects to the AP(R)-R Unit or to the CT(A)-R Unit when cable distance exceeds 200 feet.	One per Multiline Terminal as required
ACA-U Unit	The AC Adapter unit connects to one of the following: APR-U Unit, CTA-U Unit, CTU(C)-U Unit, CTU(S)-U Unit, HFU-U Unit, or DTP-16HC-1 TEL.	One per Multiline Terminal as required

Equipment Name	Description	KSU Maximum Quantities
ADA-U Unit	This Ancillary Device adapter provides the Digital Multiline Terminal with connection for a tape recorder. This adapter can be installed on any DTP or DTU Multiline Terminal except DTP-2DT-1 TEL and all Cordless terminals.	32
AD(A)-R Unit	This Ancillary Device adapter provides the Digital Multiline Terminal with connection for a tape recorder. This adapter can be installed on any DTH/DTR Multiline Terminal except DTR-2DT-1 TEL.	32
ADA(1)-W Unit	This Ancillary Device adapter provides the Electra Professional Multiline Terminal with connection for headset, or audio recorder. This adapter can be installed on any Electra Professional Multiline Terminal.	32
ADA(2)-W Unit	This Ancillary Device adapter provides the Electra Professional Multiline Terminal with connection for Cordless Telephone. This adapter can be installed on any Electra Professional Multiline Terminal.	32
AP(A)-R Unit	This Analog Port adapter without ringer is the interface used to install a Single Line Telephone, Modem, Credit Card Reader, Wireless Headset, NEC VoicePoint/VoicePoint Plus Conferencing unit, or other compatible Analog device. This adapter can be installed on any DTH/DTR Multiline Terminal except DTR-2DT-1 TEL.	32
APA-U Unit	This Analog Port adapter without ringer is the interface used to install a Single Line Telephone, Modem, Credit Card Reader, Wireless Headset, NEC VoicePoint/VoicePoint Plus Conferencing unit, or other compatible Analog device. This adapter can be installed on any DTP or DTU Multiline Terminal except DTP-2DT-1 TEL, DTP-16HC-1 TEL, or Cordless terminals.	32
AP(R)-R Unit	When this Analog Port Ringer adapter is used, an additional Single Line Telephone or a modem can be connected to a Multiline Terminal. This adapter can be installed on any DTH/DTR Multiline Terminal except DTR-2DT-1 TEL.	32
APR-U Unit	When this Analog Port Ringer adapter is used, an additional Single Line Telephone or a modem can be connected to an Electra Elite Multiline Terminal. This adapter can be installed on any DTP or DTU Multiline Terminal except DTP-2DT-1 TEL, DTP-16HC-1 TEL, or Cordless terminals.	32

Equipment Name	Description	KSU Maximum Quantities
CT(A)-R Unit	TAPI (Microsoft Telephony Application Programming Interface) adapter allows a Multiline Terminal to be connected to a PC. The terminal must be within 5 feet (1.5m) of the PC. When the length of 24AWG twisted 1-pair cable exceeds 200 feet, an AC(A)-R adapter is necessary. This adapter can be installed on any DTH/DTR Multiline Terminal except DTR-2DT-1 TEL.	32
CTA-U Unit	TAPI (Microsoft Telephony Application Programming Interface) adapter allows an Electra Elite Multiline Terminal to be connected to a PC. This adapter can be installed on any DTP or DTU Multiline Terminal except DTP-2DT-1 TEL, DTP-16HC-1 TEL, or Cordless terminals.	32
CTU(S)-U Unit	This unit is a CTA adapter for Universal Serial Bus with ESI(8)-U( ) ETU connection. This adapter can be installed on any DTP or DTU Multiline Terminal except DTP-2DT-1 TEL, DTP-16HC-1 TEL, or Cordless terminals.	32
DBM(B)-U( ) Box	This Message Display Board is connected to the ESI(8)-U( ) ETU to provide a message waiting light for voice mail boxes. Each Message Display Board supports eight message waiting lights.	8
DBM(E)-U( ) Box	Expansion for Message Display Board. Up to five DBM(E)-U( )s can be connected to one DBM(B)-U( ).	40
HFU-U Unit	This optional Handsfree Unit provides full-duplex handsfree communication. This unit comes with the handsfree adapter and an external microphone. This adapter can be installed on any DTP or DTU Multiline Terminal except DTP-2DT-1 TEL, DTP-16HC-1 TEL, or Cordless terminals.	32
PCT(S)-U( ) Unit	NEC PC Telephony Board (TAPI) without a modem. This unit can be installed on the ISA bus on any IBM-compatible PC, and it can be connected directly to the ESI port.	32
RAK-U10 Unit	This 19” unit is used to simplify installation by rack mounting the Electra Elite 48 system.	1
SLT(1)-U( ) ADP	This Adapter provides an interface for Single Line Telephones and other similar devices from an ESI ETU port. This adapter can be connected to any ESI port.	8
WM-R Unit	This Wall Mount Unit is used to mount any DTH/DTR Multiline Terminal except DTR-2DT-1 TEL to the wall and connects to the back of the Multiline Terminal. This unit is required when an AD(A)-R, AP(A)-R, AP(R)-R or CT(A)-R Unit is installed.	32

Equipment Name	Description	KSU Maximum Quantities
WMU-U Unit	This Unit is used to mount any Electra Elite Multiline Terminal to the wall, and connects to the back of the Multiline Terminal. This unit is required when an APA-U Unit, APR-U Unit, CTA-U Unit, CTU(C)/(S)-U( ) Unit, or HFU-U Unit is installed.	32
WMU-W Unit	This universal Wall Mount Unit is used to mount any Electra Professional Multiline Terminal or DTP-2DT-1 TEL to the wall.	32
ZT II	The Zone Transceiver maintains radio communication with the PS II terminals.	6
Software		
SAT S/W (END USER) S9500	System Administration Terminal Software for End User	1
SAT S/W (TECH) S9500	System Administration Terminal Software for Technician	1
SAT LCR Version 2.00	System Administration Terminal Software for Least Cost Routing	1
Wireless Service Console (WSC)	Wireless Service Console (WSC) Administration Terminal Software	1
IP Configurator	VoIP Administration Terminal (VAT) Software	1

System Specifications

CHAPTER 2

SECTION 1 GENERAL INFORMATION

This chapter provides technicians with detailed specifications for the Electra Elite 48 system. The technician should review this information carefully ***before*** installing the system.

SECTION 2 SYSTEM BLOCK DIAGRAM

Figure 2-1 System Block Diagram shows the ETUs that can be installed in the KSU and the number of channels supported when the ETU is installed. Table 2-1 List of Abbreviations lists abbreviations used in the diagram.

Table 2-1 List of Abbreviations

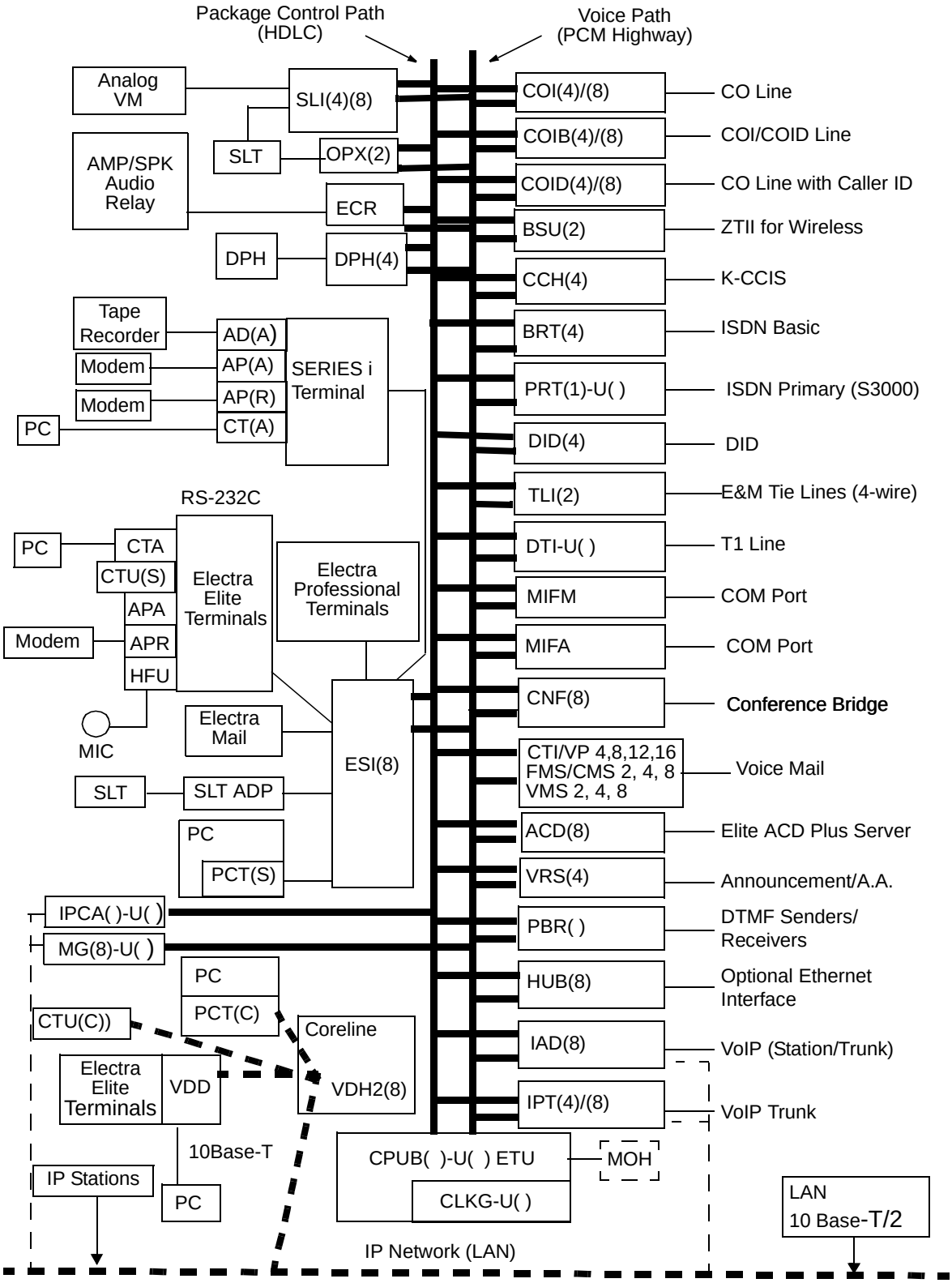
Abbreviation	Description
ACD	Automatic Call Distribution
AMP	Amplifier
APR	Analog Port Ringer
BRT	Basic Rate Trunk Interface
BSU	Base Station Unit
CCH	Common Channel Handler (K-CCIS)
CNF	Multiline Conference Bridge
COI	Central Office Interface
COIB	Central Office Interface (COI/COID mode)
COID	Central Office Caller ID
COM	Communication
CPU	Central Processor Unit
CTA	Computer Telephony Adapter
CTI/VP, FMS, VMS,CMS	Voice Mail
DID	Direct Inward Dialing
DPH	Doorphone

Table 2-1 List of Abbreviations (Continued)

Abbreviation	Description
DTI	Digital Trunk Interface
ECR	External Control Relay
ESI	Electronic Station Interface
HDLC	High Level Data Link Control
HFU	Handsfree Unit
HUB	Optional HUB Ethernet Interface
IAD	Optional Integration Device
IPCA( )-U( )	Pure IP Switch
IPT	Internet Protocol Trunk for VoIP
ISDN	Integrated Services Digital Network
K-CCIS	Key-Common Channel Interoffice Signaling
LAN	Local Area Network
MG	Gateway between IPCA ETU and MBD-U10 ETU.
MIC	Microphone
MIF	Multipurpose Interface
MOH	Music On Hold
OPX	Off-Premise Extension
PBR	Push Button Receiver
PC	Personal Computer
PCM	Pulse Code Modulation
PCT (C)	PC Telephony Board (Coreline Interface)
PCT (S)	PC Telephony Board (without Modem)
PRT	Primary Rate Trunk
PS II	Personal Station Wireless Terminal
SLI	Single Line interface
SLT	Single Line Telephone
SPK	Speaker
TLI	Tie Line Interface
VDD	Voice Data Digital Adapter
VDH	Voice Data Hub

Table 2-1 List of Abbreviations (Continued)

Abbreviation	Description
VM	Voice Mail
VoIP	Voice over Internet Protocol
VRS	Voice Recording Service
ZT II	Zone Transceiver (ZT II-U Unit)


Package Control Path (HDLC)
Voice Path (PCM Highway)
Analog VM
SLI(4)(8)
SLT
OPX(2)
AMP/SPK Audio Relay
ECR
DPH
DPH(4)
Tape Recorder
Modem
Modem
PC
AD(A)
AP(A)
AP(R)
CT(A)
SERIES i Terminal
RS-232C
PC
CTA
CTU(S)
APA
APR
HFU
Modem
Electra Elite Terminals
Electra Professional Terminals
MIC
Electra Mail
ESI(8)
SLT
SLT ADP
PC
PCT(S)
IPCA( )-U( )
MG(8)-U( )
PC
PCT(C)
CTU(C))
Coreline
Electra Elite Terminals
VDD
VDH2(8)
10Base-T
IP Stations
PC
CPUB( )-U( ) ETU
CLKG-U( )
MOH
IP Network (LAN)
LAN 10 Base-T/2
COI(4)/(8)
COIB(4)/(8)
COID(4)/(8)
BSU(2)
CCH(4)
BRT(4)
PRT(1)-U( )
DID(4)
TLI(2)
DTI-U( )
MIFM
MIFA
CNF(8)
CTI/VP 4,8,12,16
FMS/CMS 2, 4, 8
VMS 2, 4, 8
ACD(8)
VRS(4)
PBR( )
HUB(8)
IAD(8)
IPT(4)/(8)
CO Line
COI/COID Line
CO Line with Caller ID
ZTII for Wireless
K-CCIS
ISDN Basic
ISDN Primary (S3000)
DID
E&M Tie Lines (4-wire)
T1 Line
COM Port
COM Port
Conference Bridge
Voice Mail
Elite ACD Plus Server
Announcement/A.A.
DTMF Senders/ Receivers
Optional Ethernet Interface
VoIP (Station/Trunk)
VoIP Trunk

SECTION 3 MAXIMUM SYSTEM CAPACITIES

System capacities are shown in Table 2-2 Maximum System Capacities.

Table 2-2 Maximum System Capacities

Item	B48-U10 KSU	Item	B48-U10 KSU
ACD(8)-U( ) ETU	1	D^{term} Handset Cordless	24
ADA-U Unit	32		
AD(A)-R Unit	32	FMS(2)/(4)/(8)-U( ) ETU	1
APA-U/APR-U Unit AP(A)-R/AP(R)-R Unit	32	HFU-U Unit	32
BRT(4)-U( ) ETU	2	HUB(8)-U( ) ETU	1
BSU(2)-U( ) ETU	3	IAD(8)-U( ) ETU	3
CCH(4)-U( ) ETU	1	IPCA( )-U( ) ETU	1
CLKG-U( ) Unit	1	IPT(4)/(8)-U( ) ETU	Variable
CNF(8)-U( ) ETU	2	IVR(8)-U( ) ETU	1
COI(4)/(8)-U( ) ETU	4/2	MG(8)-U( ) ETU	1
COIB(4)-U( ) ETU	4 for COI Mode 2 for COID (S7) 4 for COID (S8)	MIFA-U( ) Unit	1
COIB(8)-U( )	2 for COI Mode 2 for COID Mode	MIFM-U( ) Unit	3
COID(4)/(8)-U( ) ETU	2 (S7000) 4/2 (S8000)	OPX(2)-U( ) ETU	
CT(A)-R/CTA-U Unit	32	PBR( )-U( ) ETU	1
CTI/VP(4)/(8)/(12)/(16)-U( ) ETU	1	PCT(C) -U( ) Unit	32
CTU(C)/(S)-U Unit	32	PCT(S) -U( ) Unit	32
DBM(B) -U( ) Box	8	PRT(1)-U( ) Unit	1 (S7000) 4 (S8000)
DBM(E)-U( ) Box	40	SLI(4)-U( ) ETU	4
D^{term} PS II	24	SLI(8)-U( ) ETU	3
DTI-U( ) ETU	1 (S7000) 4 (S8000)	TLI(2)-U( )	4
ECR-U( ) ETU	1	VDD-U Unit	
ESI(8)-U( ) ETU	3	VDH2(8)-U( ) ETU	24

Table 2-2 Maximum System Capacities (Continued)

Item	B48-U10 KSU	Item	B48-U10 KSU
DID(4)-U( ) ETU	4	VMS(2)/(4)/(8)-U( ) ETU	1
DPH(4)-U( ) ETU	1	VMS/FMS/CMS-U30	1
D^{term} Analog Cordless	20	VRS(4)-U( ) ETU	2
D^{term} Cordless II	10	ZT II	

☞ Only one VMS. one FMS, one CMS, or one CTI/VP can be installed in the system.

SECTION 4 SYSTEM REQUIREMENTS AND SPECIFICATIONS

CABLING REQUIREMENTS AND SPECIFICATIONS

The KSU is connected with each of the Multiline Terminals and Single Line Telephones by a separate twisted 1-pair cable or 2-pair cable (only for Multiline Terminals). Refer to Table 2-3 Multiline Terminal Loop Resistance and Cable Length, Table 2-4 Cable Connection Between the Analog Port and the Single Line Equipment, Table 2-5 Cable Connection Between ESI/VDH and PCT Board, Table 2-6 Cabling Requirements, and Table 2-7 Zone Transceiver II Range.

Table 2-3 Multiline Terminal Loop Resistance and Cable Length

Terminal or Adapter	Maximum Loop Resistance (Ohms)	Maximum Feet by Twisted 1-Pair Cable	Maximum Feet by Twisted 2-Pair Cable
		24 AWG	24 AWG
DBM(B)-U10 Box	N/A	900	900
DCR-60-1 CONSOLE	N/A	1000	1000
DCU-60-1 CONSOLE	N/A	1000	1000
DTP-2DT-1 TEL	35	600	1000
DTR-2DT-1 TEL	36 (26*)	630 (450*)	1000 (900*)
DTU 4R-1 TEL	N/A	650	1000
DTP-8-1 TEL DTU-8-1 TEL	35	600	1000
DTH-8-1 TEL DTR-8-1 TEL	36	630	1000

Terminal or Adapter	Maximum Loop Resistance (Ohms)	Maximum Feet by Twisted 1-Pair Cable	Maximum Feet by Twisted 2-Pair Cable
		24 AWG	24 AWG
DTP-8D-1 TEL DTU-8D-2 TEL	35	600	1000
DTH-8D-1 TEL DTR-8D-1 TEL	36	630	1000
DTP-16-1 TEL DTU-16-1 TEL	26	450	900
DTP-16D-1 TEL DTU-16D-2 TEL	26	450	900
DTH-16D-1 TEL DTR-16D-1 TEL	35	600	1000
DTP-16HC-1 TEL	57	1083	
DTP-32-1 TEL DTU-32-1 TEL	21	360	720
DTP-32D-1 TEL DTU-32D-2 TEL	21	360	720
DTH-32D-1 TEL DTR-32D-1 TEL	26	450	900
DTR-1R-1 TEL	35	600	1000
DTR-4R-1 TEL	N/A	650	1000
ETW-8-1/2 TEL	35	600	1000
ETW-16DC-1/2 TEL	26	450	900
ETW-16DD-1/2 TEL	21	360	720
ETW-24DS-1/2 TEL	26	450	900
ETW-4R-1 TEL	N/A	650	650
EDW-48-1/2 DSS/BLF with AC Adapter	N/A	1000	1000
SLT(1)-U( ) ADP	35	600	1000

☞ An SLT AC Adapter is required with installation of the following devices: DTP-16HC-1 Telephone, Electra Elite DCU-60 Console, or Electra Professional ETW-48 Console.

☞ The length for the specified SLT Adapter is the length between the SLT Adapter and the ESI.

☞ The values (number of ohms and feet of cable) specified with the ***** include the DTR-2DT-1 TEL *plus* the Single Line Telephone.

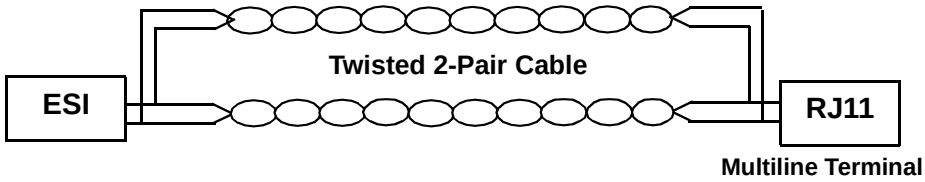


Figure 2-2 Connecting the ESI to the Multiline Terminal Using Twisted 2-Pair Cable

Table 2-4 Cable Connection Between the Analog Port and the Single Line Equipment

Connected Equipment	Cable	Maximum Loop Resistance (24 AWG) from Connected Equipment to Telephone
AD(A)-R Unit	Twisted Pair	10 feet
ADA(2)-W Unit	Twisted Pair	10 feet
AP(R)-R or AP(A)-R Unit	Twisted Pair	50 feet
APR-U or APA-U Unit	Twisted Pair	50 feet
OPX(2)-U( ) ETU	Twisted Pair	1600 ohms
SLI(4)/(8)-U( ) ETU	Twisted Pair	300 ohms
SLT(1)-U( ) ADP	Twisted Pair	50 feet

☞ Do not mix digital and analog ports through the same 25-pair cable run.

Table 2-5 Cable Connection Between ESI/VDH and PCT Board

Connected Equipment	Cable	Maximum Loop Resistance (Ohms)	Attached Telephone
PCT(C)-U( ) Unit	10 Base-T	35	Connected
		31	Not Connected
PCT(S)-U( ) Unit	Twisted 1-Pair	35	Connected
		31	Not Connected

Table 2-6 Cabling Requirements

Connected Equipment	Cable
External Amplifier	Hi-Fi Shielded Audio Cable
Music on Hold and Background Music Sources	Hi-Fi Shielded Audio Cable

Table 2-7 Zone Transceiver II Range

Connected Equipment	Range
ZT II-U Unit without ACA-U Unit	3000 feet
ZT II-U Unit with ACA-U Unit	16,404 feet

4.1 Cabling Precautions

4.1.1 Cable Placement

When selecting cables and Main Distribution Frame (MDF), future expansion or assignment changes should be considered. Do not run cables in the following places:

- A place exposed to wind or rain.
- A place near heat radiating equipment or where the quality of station cable covering could be affected by gases and chemicals.
- An unstable place subject to vibration.

4.1.2 Environmental Conditions

Temperature

- Operating: +32°F ~ +104°F (0°C ~ 40°C)
- Long Term: +50°F ~ +90°F (10°C ~ 32.2°C)

Humidity

- Operating: 10% ~ 90% noncondensing

4.2 Power Requirements

4.2.1 Power Supply Inputs

The AC input requirements for the Electra Elite 48 system are listed below.

AC Input (P64-U10 PSU)

- 117 Vac ± 10%
- 60 Hz ± 10%
- Single Phase
- 2.5A circuit
- A dedicated outlet, separately fused and grounded

4.2.2 Power Supply Consumption

The power consumption for the Electra Elite 48 system is listed in Table 2-8 Power Consumption.

Table 2-8 Power Consumption

KSU	Maximum RMS Current	Watts Used (Idle)	Watts Used (Maximum)
B48-U10 KSU	2.5 A	90	230

4.2.3 Fuse Replacement

When replacing fuses, refer to the specifications in Table 2-9 Fuse Replacement.

Table 2-9 Fuse Replacement

Unit	Fuse Number	Specifications	Description	Dimensions
P64-U10 PSU	F1	125V, 6.0A	AC Input	1/4” x 1-1/4”
P64-U10 PSU	F101	250v, 10A	Battery Input	1/4” x 1-1/4

☞ All fuses are normal blown glass tube.

Do not use slow blow fuses. Replace with a fuse of the same type and rating.

4.3 Outside Line Types

The following outside lines can be used with the Electra Elite 48 system.

- 2-wire, Loop Start or Ground Start Trunks
- 2-wire, 2-way DID Lines (Dial Pulse or DTMF)
- 4-wire, E&M Tie Lines (Type I or V, Dial Pulse, or DTMF)
- Digital Trunk FT1 (Loop Start, Ground Start, Tie Line E&M, or DID Signaling)
- ISDN-BRI Trunks
- ISDN-PRI Trunks
- VoIP Trunks (Internet Protocol)

Refer to Table 1 FIC, REN, SOC, and Jack Types for Electra Elite System ETU in the Regulatory Information section in this manual for a detailed list of Facility Interface Codes, Ringer Equivalence Numbers, Service Order Codes and Jack Types.

4.4 Transmission, Network, and Control Specifications

4.4.1 Transmission

- Data Length

  From Multiline Terminal to ESI(8)-U( ) ETU: 23 bits

  From ESI(8)-U( ) ETU to Multiline Terminal: 23 bits

- Data Transmission Rates:

  Between ESI(8)-U( ) ETU and Multiline Terminal: 184K bps (voice and signaling)

- Scanning Time for each Multiline Terminal: 32 ms.

4.4.2 Network

Time Division Multiplexing allows transmission of separate data, voice and/or video simultaneously over one communications medium. The Electra Elite 48 system specifications used for switching, clock, data bus, and timeframe are shown below.

- ✆ TDM Switching: PCM (µ Law)
- ✆ TDM Clock: 2.048 MHz
- ✆ TDM Data Bus: 8 bit
- ✆ TDM Timeframe: 125 µs.

4.4.3 Control

This section lists the speed or capacity.

- ✆ Control: Stored program with distributed processing
- ✆ Central Processor: 32-bit microprocessor
- ✆ Clock: 16.384 MHz
- ✆ Interface ETU: 8-bit or 16-bit microprocessor
- ✆ Optional ETUs: 16-bit or 32-bit microprocessor
- ✆ Multiline Terminal: 8-bit microprocessor
- ✆ Attendant Console: 4-bit microprocessor
- ✆ SLT Adapter: 4-bit microprocessor

4.4.4 Electra Elite Terminals and Equipment

The voltage, current, ring signal information for the Elite Multiline Terminals, Single Line Telephone equipment, and APA-U/APR-U Unit are listed below.

- ✆ Multiline Terminal

  Voltage: -11 ~ -26 Vdc

  Maximum Current: 250 mA

  ☞ Acoustical characteristics meet Electronic Industry Association (EIA) standard proposal SP-1286 and standard EIA RS-470.

- ✆ Single Line Telephone

  Standard 2500 Set: 500 type network

  Nominal Current: 35 mA

  Ring Signal: 56 Vac RMS @ 20 Hz

- SLT(1)-U( ) ADP

  Standard 2500 Set: 500 type network

  Nominal Current: 30 mA

  Ring Signal: 56 Vac RMS @ 20 Hz

- APA-U Unit

  Standard 2500 Set: 500 type network

  Nominal Current: 30 mA

- APR-U Unit

  Standard 2500 Set: 500 type network

  Nominal Current: 30 mA

  Ring Signal: 56 Vac RMS @ 20 Hz

4.4.5 Electra Elite IPK and Series i Terminals and Equipment

The voltage, current, ring signal information for the Electra Elite IPK and D^{term} Series i Multiline Terminals, Single Line Telephone equipment, and AP(A)-R/AP(R)-R unit are listed below.

- Multiline Terminal (Series i)

  Voltage: -11 ~ -48 Vdc

  Maximum Current: 250 mA

  ☞ Acoustical characteristics meet Electronic Industry Association (EIA) standard proposal SP-1286 and standard EIA RS-470.

- Single Line Telephone

  Standard 2500 Set: 500 type network

  Nominal Current: 35 mA

  Ring Signal: 56 Vac RMS @ 20 Hz

- SLT(1)-U( ) ADP

  Standard 2500 Set: 500 type network

  Nominal Current: 30 mA

  Ring Signal: 56 Vac RMS @ 20 Hz

- AP(A)-R Unit

  Standard 2500 Set: 500 type network

  Nominal Current: 30 mA

- AP(R)-R Unit

  Standard 2500 Set: 500 type network

  Nominal Current: 30 mA

  Ring Signal: 56 Vac RMS @ 20 Hz

4.5 Dialing Specifications

4.5.1 Dial Pulse Address Signaling

Dial Pulse Address Signaling uses dial pulses to signal the equipment. In the Electra Elite 48 system, the following Dial Pulse specifications are used.

- Pulse Rate: 10 ± 0.5 pps/20 ± 1.0 pps
- Percent Break: 60 ± 1.5%
- Interdigit Interval: 10 pps/20 pps 770 ~ 830 ms.

4.5.2 Dual-Tone Multifrequency (DTMF) Address Signaling

DTMF signaling describes push button or Touchtone dialing. When a key on a telephone is pushed, two tones (one high frequency and one low frequency) are provided. In the Electra Elite 48 system, the following DTMF specifications are used.

- Frequencies

  Two sinusoidal frequencies are provided, one from the high frequency group and one from the low frequency group.

- Frequency Deviation: Less than ±1.0%
- Signal Level:

  Nominal level per frequency: -6 ~ -4 dBm

  Minimum level per frequency:

  Low Group: -10 dBm

  High Group: -8 dBm

  Maximum level per frequency: 0 dBm

- Rise Time: Within 5 ms.

- Duration of Dual Frequency Signal:

  110 ms. default/60 ms. minimum

- Interdigital Time: 80 ms. default/70 ms. minimum

Nominal **Low** Group Frequencies (Hz) \ Nominal **High** Group Frequencies (Hz)	1209	1336	1477
697	1	2	3
770	4	5	6
852	7	8	9
941	Q	0	#

4.6 Battery Backup

The Electra Elite 48 system has two battery backup functions: one for system backup and one for memory backup.

4.6.1 System Backup

During power failure, the system is backed up using a rechargeable battery. This battery backup supports all of the system operations for approximately 30 minutes.

4.6.2 Memory Backup

The MBD-U10 Unit has a battery installed to provide backup of system memory. When the battery is fully charged, system memory (customer data) is retained for approximately 21 days.

4.7 Weights and Dimensions

Table 2-10 Weights and Dimensions indicates the shipping weight, height, width, and depth of the Electra Elite 48 KSU and each ETU, Multiline Terminal, and adapter.

Table 2-10 Weights and Dimensions

Unit	Shipping Weight*	Height	Width	Depth
AC-R Unit	5.6 oz (158 g)	3.61” (92 mm)	6.87” (175mm)	4.2” (107 mm)
ACA-U Unit	22.5 oz (638 g)	3.4” (86 mm)	4.2” (107 mm)	5.2” (133 mm)
ACD(8)-U( ) ETU	6.4 lbs** (2903 g)	1.89” (48 mm)	11.47” (290 mm)	8.46” (214 mm)
AD(A)-R Unit	4.0 oz (113 g)	2.25” (56.25 mm)	2.75” (68.75mm)	5.5” (137.5 mm)
ADA-U Unit	2.3 oz (65 g)	1.1” (29 mm)	2.3” (59 mm)	3.9” (99 mm)
AP(A)-R Unit or AP(R)-R Unit	5.6 oz (158 g)	2.25” (56.25 mm)	2.75” (68.75mm)	5.5” (137.5 mm)
APA-U Unit or APR-U Unit	4.3 oz (122 g)	2.4” (60 mm)	2.3” (59 mm)	4.8” (121 mm)
B48-U10 KSU	396 oz (11230 g)	12” (305 mm)	18” (457 mm)	18” (457 mm)
BRT(4)-U( ) ETU	14.6 oz (414 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
BSU(2)-U( ) ETU	13.2 oz (374 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
CCH(4)-U( ) ETU	12.0 oz (340 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
CNF(8)-U( ) ETU	12.0 oz (340g)	1.89” (48 mm)	11.47” (290 mm)	8.46” (214 mm)
COI(4)-U( ) ETU	13.6 oz (385 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
COI(8)-U( ) ETU	16.6 oz (471 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
COIB(4)/(8)-U( ) ETU	14.4 oz (408 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
COID(4)-U( ) ETU	14.4 oz (408 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
COID(8)-U( ) ETU	17.3 oz (490 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
CT(A)-R Unit	4.0 oz (113 g)	2.25” (56.25 mm)	2.75” (68.75mm)	5.5” (137.5 mm)
CTA-U Unit	5.6 oz (158 g)	2.4” (60 mm)	2.3” (59 mm)	4.8” (121 mm)
CTI/VP(4)/(8)/(12)/(16)-U( ) ETU	12 lbs** (5.44 Kg)	1.89” (48 mm)	11.47” (290 mm)	8.46” (214 mm)

Unit	Shipping Weight*	Height	Width	Depth
CTU(C)-U Unit	9.5 oz (270 g)	2.4” (60 mm)	4.3” (110 mm)	4.4” (112 mm)
CTU(S)-U Unit	9.5 oz (270 g)	2.4” (60 mm)	4.3” (110 mm)	4.4” (112 mm)
DBM(B)-U( ) Box	74.4 oz (2109 g)	2.75” (70 mm)	13.5” (343 mm)	9.75” (248 mm)
DBM(E)-U( ) Box	74.4 oz (2109 g)	2.75” (70 mm)	13.5” (343 mm)	9.75” (248 mm)
DCR-60-1 Console	53 oz (1503 g)	4.2” (107mm)	12.8” (326 mm)	7.14” (182mm)
DCU-60-1 Console	53 oz (1503 g)	3.6” (92 mm)	8.8” (223 mm)	10.6” (270 mm)
DID(4)-U( ) ETU	15.5 oz (439 g)	1.89” (48 mm)	11.47” (290 mm)	8.46” (214 mm)
DP-D-1A Doorphone	8.4 oz (238 g)	1.5” (38 mm)	5.5” (140 mm)	4.75” (121 mm)
DPH(4)-U( ) ETU	12.1 oz (343 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
DTI-U( ) ETU	13.2 oz (374 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
DTP-1-1 TEL DTP-1-2 TEL DTP-1HM-1 TEL DTP-1HM-2 TEL	26.8 oz (760 g)	2.36” (60 mm)	6.22” (158 mm)	8.81” (224 mm)
DTR-1-1) TEL	26.8 oz (760 g)	2.47” (100mm)	7.65” (195 mm)	9.53” (243 mm)
DTP-2DT-1 TEL	41 oz (1163 g)	4.8” (123mm)	7.8” (197 mm)	9.3” (235 mm)
DTR-2DT-1 TEL	41 oz (1163 g)	2.47” (100mm)	7.65” (195 mm)	9.53” (243 mm)
DTU-4R-1 TEL	15.4 oz (437 g)	2.25” (57 mm)	4.25” (108 mm)	7.5” (191 mm)
DTP-8-1 TEL DTU-8-1 TEL	41.0 oz (1163 g)	4.8” (123 mm)	7.8” (197 mm)	9.3” (235 mm)
DTH-8-1 TEL DTR-8-1 TEL	41.0 oz (1163 g)	4.78” (122 mm)	10.2” (260 mm)	9.8” (250 mm)
DTP-8D-1 TEL DTU-8D-2 TEL	43.5 oz (1233 g)	4.8” (123 mm)	7.8” (197 mm)	9.3” (235 mm)
DTH-8D-1 TEL DTR-8D-1 TEL	43.5 oz (1233 g)	4.78” (122 mm)	10.2” (260 mm)	9.8” (250 mm)
DTP-16HC-1 TEL	53 oz (1503 g)	6.00” (152 mm)	9.08” (230 mm)	8.04” (204 mm)

Unit	Shipping Weight*	Height	Width	Depth
DTP-16-1 TEL DTU-16-1 TEL	41 oz (1162 g)	4.8” (123 mm)	7.8” (197 mm)	9.3” (235 mm)
DTP-16D-1 TEL DTU-16D-2 TEL	43.5 oz (1233 g)	4.8” (123 mm)	7.8” (197 mm)	9.3” (235 mm)
DTH-16D-1 TEL DTR-16D-1 TEL	43.5 oz (1233 g)	4.78” (122 mm)	10.2” (260 mm)	9.8” (250 mm)
DTP-32-1 TEL DTU-32-1 TEL	46 oz (1304 g)	4.8” (123 mm)	8.7” (220 mm)	9.3” (235 mm)
DTP-32D-1 TEL DTU-32D-2 TEL	48 oz (1361 g)	4.8” (123 mm)	8.7” (220 mm)	9.3” (235 mm)
DTH-32D-1 TEL DTR-32D-1 TEL	48 oz (1361 g)	4.78” (122 mm)	10.2” (260 mm)	9.8” (250 mm)
DTR-1R-1 TEL	14.4 oz (408g)	4.5” (114 mm)	6.1 (153 mm)	8.62 (218 mm)
DTR-4R-1 TEL	15.4 oz (437 g)	2.25” (57 mm)	4.25” (108 mm)	7.5” (191 mm)
ECR-U( ) ETU	21.2 oz (344 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
EDW-48-1/2 TEL	49 oz (1389 g)	2.72” (69 mm)	6.89” (175 mm)	8.81” (223 mm)
ESI(8)-U( ) ETU	14.5 oz (411 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
ETW-4R-1 TEL	26oz (737 g)	3.42” (87 mm)	5.51” (140 mm)	7.48” (190 mm)
ETW-8-1/2 TEL	32 oz (907 g)	3.98” (101mm)	6.89” (175 mm)	8.81” (223 mm)
ETW-16DC-1/2 TEL	35 oz (992 g)	3.98” (101mm)	6.89” (175 mm)	8.81” (223 mm)
ETW-16DD-1/2 TEL	39 oz (1106 g)	3.98” (101mm)	8.07” (205 mm)	8.81” (223 mm)
ETW-24DS-1/2 TEL	39 oz (1106 g)	3.98” (101mm)	8.07” (205 mm)	8.81” (223 mm)
EXP-U( ) ETU	14.6 oz (414 g)	1.89” (48 mm)	11.47” (290 mm)	8.46” (214 mm)
FMS(2)/(4)/(8)-U( ) ETU FMS/VMS/CMS-U30 ETU	6.4 lbs** (2903 g)	1.89” (48 mm)	11.47” (290 mm)	8.46” (214 mm)
HFU-U Unit	7.1 oz (201 g)	2.4” (60 mm)	4.2” (107 mm)	5.2” (133 mm)
HUB(8)-U( ) ETU	10.4 oz (294 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)

Unit	Shipping Weight*	Height	Width	Depth
IAD(8)-U( ) ETU	8.11 oz (230 g)	7.5“ (190 mm)	6.3” (160 mm)	0.87” (22 mm)
IPT(4)-U( ) ETU	32 oz 907g	5.0” (127 mm)	10” (254 mm)	10” (254 mm)
IPT(8)-U( ) ETU	32 oz 907g	5.0” (127 mm)	10” (254 mm)	10” (254 mm)
ITH-8D-2 TEL ITH-16D-2 TEL	50.92 oz (1445 g)	9.84” (250 mm)	10.31” (262 mm)	4.76” (121 mm)
IVR(8)-U( ) ETU	14.6 oz (414 g)	1.75 “ (44 mm)	10.5” (266 mm)	8.62” (219 mm)
MG(8)-U( ) ETU	14.6 oz (414 g)	1.75 “ (44 mm)	10.5” (266 mm)	8.62” (219 mm)
MIFA-U( ) ETU	12.1 oz (343 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
MIFM-U( ) ETU	12.3 oz (349 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
OPX(2)-U( ) ETU	13.4 oz (380 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
PBR( )-U( ) ETU	10.7 oz (303 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
PRT(1)-U( ) ETU	13.2 oz (374 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
RAK-U10 Unit	20 lbs (9072 g)	20” (507 mm)	15” (380 mm)	8.5” (216 mm)
SLI(4)-U( ) ETU	13.0 oz (370 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
SLI(8)-U( ) ETU	14.1 oz (400 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
SLT(1)-U( ) ADP	9 oz. (255 g)	1.8” (45 mm)	2.8” (70 mm)	4.8” (120 mm)
TLI(2)-U( ) ETU	13.8 oz (391 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
VMS(2/4/8)-U( ) ETU	6.4 lbs** (2903 g)	1.89” (48 mm)	11.47” (290 mm)	8.46” (214 mm)
VMS/FMS/CMS-U30	6.4 lbs** (2903 g)	1.89” (48 mm)	11.47” (290 mm)	8.46” (214 mm)
VRS(4)-U( ) ETU	12.0 oz (340 g)	1.97” (50 mm)	9.47” (240 mm)	7.68” (195 mm)
WM-R Unit	10.6 oz (301 g)	4.1” (104 mm)	5.9” (151 mm)	7.1” (180 mm)

Unit	Shipping Weight*	Height	Width	Depth
WMU-U Unit	10.6 oz (301 g)	4.1” (104 mm)	5.9” (151 mm)	7.1” (180 mm)
WMU-W Unit	20.0 oz (567 g)	5.75” (147 mm)	5.75” (147 mm)	2.5” (63 mm)

* Shipping weight includes the shipping carton.

** Shipping weight includes the shipping carton and documentation.

4.8 External Equipment Interface

Input signal levels, impedance, contact ratings, and connector types are listed for externally connected equipment.

4.8.1 Music on Hold/Station Background Music

- ✆ Auxiliary Input: 0.6V PPS Signal Level
- ✆ Input Impedance: 600 Ω

4.8.2 External Paging (Audio)

- ✆ Output Power: -10 dBm Signal Level
- ✆ Output Impedance: 600 Ω
- ✆ Relay Contact Rating: 500 mA, 24 Vdc

4.8.3 External Tone Ringer/Night Chime Output

- ✆ Output Power: -10 dBm
- ✆ Output Impedance: 600 Ω
- ✆ Relay Contact Rating: 500 mA, 24 Vdc

4.8.4 SMDR Output

- ✆ Female Connector (System Output): Standard RS-232C (straight)

4.8.5 PC Connection

- ✆ Female Connector (System Output): Standard RS-232C (straight)

4.8.6 Relay Contact

- ✆ All Relay Contact Ratings: 500 mA, 24 Vdc

4.9 Audible and Visual Indications

The tables in this section provide the audible and visual indications used in the Electra Elite 48 systems.

4.9.1 Tone Patterns

Tones are used in the Electra Elite 48 systems to inform the station user of various functions of the systems such as, dial tone, busy tone, or ringback tone. Table 2-11 Tone Patterns lists the frequency and the pattern for the tones used in the Electra Elite 48 system.

4.9.2 LED Flash Patterns

The Electra Elite 48 system provides 2-color LEDs. Green is used primarily for I-Use conditions and for outside calls. Red is used primarily for Other Use conditions and internal calls. Refer to Table 2-12 Multiline Terminal LED Flash Pattern.

Table 2-11 Tone Patterns

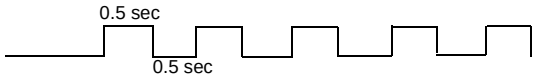
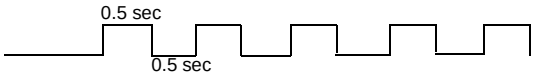
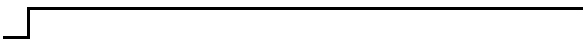
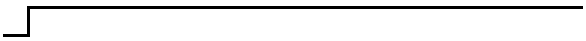
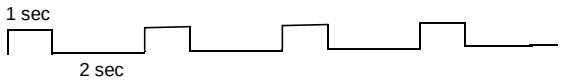
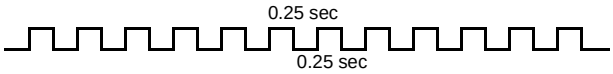
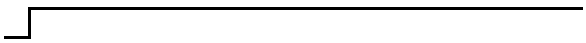
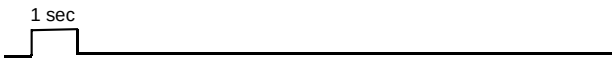
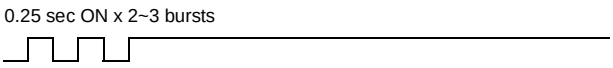
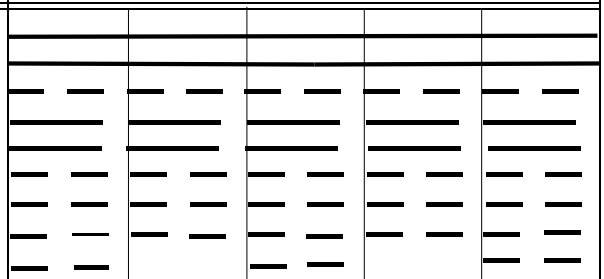
System Tone (Fixed)	Frequency (Hz) (Fixed)	Intermit (Default)	Cycle
Busy Tone	480/620	60 IPM	
Call Waiting Tone	440	60 IPM	
Second Dial Tone	350/440	120 IPM	
Howler Tone	2400 Modulation (16 Hz)	Continuous	
Internal Dial Tone	350/440	Continuous	
Internal Ringback Tone	440/480	1 sec On 2 sec Off	
LCR Dial Tone	440	Continuous	
Reorder Tone	480/620	120 IPM	
Service Set Tone	440	Continuous	
Special Dial Tone	440	240 IPM	
Tone Burst 1 Tone	440	Continuous	
Tone Burst 2 Tone	620	Continuous	
Tie/DID Ringback Tone	440/480	2 sec On 4 sec Off	
Camp-On Tone Call Alert Notification Attendant Tone Override	440	Continuous	
DIT Alert Tone	480/620	Continuous	
Call Forward Alert Tone Call Forward Configuration Tone	350/440	120 IPM	

Table 2-12 Multiline Terminal LED Flash Pattern

LED	Condition	Color	Flash Patterns
Linekey	I-Use	Green	
	Busy	Red	
	Incoming Call	Red	
	I-Hold	Green	
	Call Hold	Red	
	Hold Recall	Green	
	Transfer Recall	Green	
	Live Monitoring Mode	Green	
	Message Waiting on Line Key	Red	
Microphone	ON	Red	
MIC	ON (Electra Elite IPK/Series i)	Red	
Linekey ICM	I-Use	Red	
	ICM Incoming Call	Red	
	Voice Over Broker	Red	
Large LED	Incoming Internal Call	Red	
	Incoming Outside Call	Green	
	Message from Attendant	Green	
	Voice Mail Message	Red	
Speaker	ON	Red	
	System Data Entry	Red	
Conf	Conference in Progress/Barge In	Red	
	All Conference Circuits Used	Red	
	Hold Conference Call	Red	
	ICM Call Hold	Red	
	SPD Confirmation	Red	
Answer	Incoming Trunk	Red	
	Exclusive Hold	Green	
	User Ringing Line Preference	Red	
	Voice Over with Broker's Call	Green	
Feature	Callback Set	Red	
	Auto Repeat Set	Red	
	ON (to set function)	Red	
	Call FWD - All Calls Set	Red	
Linekey BLF or DSS Key	Use, Hold	Red	
	DND, Call FWD-All Calls Set	Red	
	Special Mode (while pressing Feature or going off-line)	Red	

0 0.5 1.0 1.5 2.0 sec.

Hardware Requirements

CHAPTER 3

SECTION 1 GENERAL INFORMATION

The technician should be familiar with the Electra Elite 48 system ***before*** attempting to install it. Review this chapter carefully.

SECTION 2 PROGRAMMING STATIONS

Two programming positions are available in the Electra Elite 48 system. Station equipment that is connected to the first ESI(8)-U( ) ETU is automatically set as a programming position and must be a display Multiline Terminal.

SECTION 3 ATTENDANT STATIONS

An unlimited number of Attendant positions can be assigned in the Electra Elite 48 system. An Attendant Position can have one to four DCU-60-1 Consoles attached. Each Attendant Console must be supported by an ESI(8)-U( ) ETU. A maximum of ***four*** Attendant Consoles can be installed in each Electra Elite 48 system.

SECTION 4 PROGRAMMING FROM A PC

Electra Elite 48 systems can be programmed from a personal computer. The Menu Programming option available with PC Programming allows the technician/end-user easy access to all information that can be programmed on the Electra Elite 48 system. The PC must be a 486 or higher and have Windows 95 or higher to be compatible with the Electra Elite 48 system.

SECTION 5 PROGRAMMING FROM A MULTILINE TERMINAL

Programming for the Electra Elite 48 system is accomplished through PC Programming. As an added convenience, programming for the system can be accomplished using Electra Elite or Electra Professional Multiline Terminals with LCD. Multiline Terminal programming should be used after the system is installed and any initial assignments are made. Using the Multiline Terminal provides a quick way to access system data and make changes to data items. To program from a Multiline Terminal one of the following terminals is required.

- DTP/DTH/DTR-8D-1 TEL
- DTU-8D-2 TEL
- DTP/DTH/DTR-16D-1 TEL
- DTU-16D-2 TEL
- DTP/DTH/DTR-32D-1 TEL
- DTU-32D-2 TEL
- ETW-16DC-1/2 TEL
- ETW-16DD-1/2 TEL
- ETW-24DS-1/2 TEL

SECTION 6 ELECTRA ELITE 48 REMOTE PC PROGRAMMING

The Electra Elite 48 system can be programmed from a remote location using a personal computer.

6.1 Remote Programming

To provide remote programming the following hardware is required:

- Analog CO Trunk or system SLT Port (not needed when the optional internal modem is used)
- A straight RS-232C cable and adapter (provided with the MIFM-U( ) ETU) cable to connect a locally provided modem (not needed when the optional internal modem is used)
- MIFM-U( ) ETU installed in the Electra Elite 48 system

SECTION 7 DETERMINING REQUIRED EQUIPMENT

To determine equipment type and quantity to be installed, the technician must be familiar with available station equipment and interface ETUs.

7.1 Station Equipment

The station equipment that can be installed with the Electra Elite 48 system is listed below.

Equipment	Description
DBM(B)-U( ) Box	Basic Message Display Board with 8 LEDs
DBM(E)-U( ) Box	Expansion Message Display Board with 8 LEDs
DCR/DCU-60-1 CONSOLE	Attendant Console with 60 programmable line keys
DTP/DTH/DTR-2DT-1 TEL	2-line digital Multiline Terminal without LCD
DTP/DTH/DTR/DTU-8-1 TEL	8-line digital Multiline Terminal without LCD
DTP/DTH/DTR-8D-1 TEL DTU-8D-2 TEL	8-line digital Multiline Terminal with LCD and softkeys
DTP/DTU-16-1 TEL	16-line digital Multiline Terminal without LCD
DTP/DTH/DTR-16D-1 TEL DTU-16D-2 TEL	16-line digital Multiline Terminal with LCD and softkeys
DTP-16HC-1 TEL	16-line digital stand alone terminal with direct connection to a single port on the ESI(8)-U10 ETU
DTP/DTU-32-1 TEL	32-line digital Multiline Terminal without LCD
DTP/DTH/DTR-32D-1 TEL DTU-32D-2 TEL	32-line digital Multiline Terminal with LCD and softkeys
DTR-1R-1 TEL	D^{term} Analog Cordless Terminal without LCD

Equipment	Description
DTR-4R-1 TEL	D^{term} Cordless II Terminal with LCD
DTU-4R-1 TEL	D^{term} Cordless Lite Terminal with LCD
ETW-8-1/2 TEL	8-line Multiline Terminal without LCD
ETW-16DC-1/2 TEL	16-line Multiline Terminal with LCD
ETW-16DD-1/2 TEL	16-line Multiline Terminal with LCD
ETW-24DS-1/2 TEL	24-line Multiline Terminal with LCD
ETW-4R-1(BK) TEL	D^{term} Cordless Terminal with LCD
EDW-48-1/2 DSS/BLF	48-line DSS/BLF or outside lines with 12 function keys.
SLT(1)-U( )ADP	Single Line Telephone Interface Adapter

7.2 Interface ETUs

The Electra Elite 48 has seven slots. Slot 1 is a fixed ESI slot that is built-in on the MBD-U( ) Unit. Slot S2 is an ISA slot without MDF connections.

Slots S3 ~ S6 are interface (IF) slots with MDF connections. Slot S7 is an interface slot without MDF connections. Only cards that do not require MDF connections (*e.g.*, CTI(4)/(8),FMS, VMS, VRS, PBR, VDH, and ACD(8)) can be installed in Slot S2 or Slot S7.

7.2.1 Determining Telephone and CO Port Numbers

Telephone and CO Ports numbers are provided with the Electra Elite 48 system. Port numbers are used to count the station numbers and trunk numbers when programming System Data. The example below indicates how the CO and trunk numbers can be used.

The following ETUs are installed for the Figure 3-1 Telephone and CO Port Numbering Example.

Slot	ETU
S1	ESI(8)-U( ) (Built-In)
S2	MIFM-U( )
S3	COI(8)-U( )
S4	TLI(2)-U( )
S5	ESI(8)-U( )
S6	SLI(8)-U( )
S7	VMS(4)-U( )

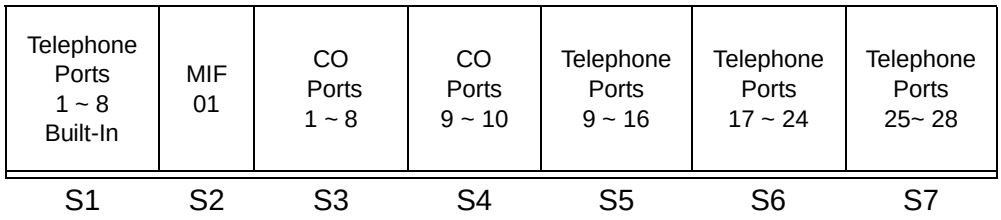


Figure 3-1 Telephone and CO Port Numbering Example

7.2.2 Determining the Number of Required Interface ETUs

Table 3-1 Number of Required Interface ETUs indicates each feature and the associated hardware necessary for the operation of the feature.

Table 3-1 Number of Required Interface ETUs

Feature	Required ETU	Required Feature Key	Maximum ETUs per System
ANI/Caller ID (Refer to ☞)	MIFM-U( )	KMM(1.0)U	1
ACD Plus Automatic Call Distribution (Refer to ☞)	MIFM-U( )	N/A	N/A
Least Cost Routing	MIFM-U( )	KMM(1.0)U	1
PC Programming	MIFM-U( )	None	1
SMDR	MIFM-U( )	None	1
Uniform Call Distribution	MIFA-U( )	None	1
Wireless Service Console (WSC)	MIFM-U( )	None	1

☞ The Caller ID feature works without the MIFM-U( ) ETU. However, the Caller ID scrolling and dialing both require the MIFM-U( ) ETU with KMM(1.0)U.

☞ ACD Plus ACD requires the MIFM-U( ) during installation and servicing.

7.2.3 PBR Requirements

The Electra Elite 48 system has four built-in Push Button Receiver (PBR) circuits on the MBD-U( ) Unit. The PBR circuit detects and translates DTMF tones generated by Single Line Telephones, facsimile machines, modems, and analog voice mail ports. Incoming DTMF signals can also be detected from a CO trunk using the DISA feature. The system Automated Attendant feature and DISA feature must use the MBD-U( ) Unit PBR circuits.

An optional PBR( )-U( ) ETU that provides an additional four circuits can be installed. The number of PBR( )-U( ) ETUs needed depends on the number of Single Line Telephones, facsimile machines, modems, and analog voice mail ports needed. Automated Attendant and DISA trunks connected to the system must also be considered.

☞ When the optional PBR( )-U( ) ETU is installed, these PBR circuits can be used only for SLI ports connected to the system.

Installing the KSU

CHAPTER 4

SECTION 1 GENERAL INFORMATION

This chapter provides the information necessary to install the KSU for the Electra Elite 48 system. The technician should be familiar with this section before installing any equipment.

SECTION 2 SITE PREPARATION AND MDF/IDF CONSTRUCTION

Plan the installation before actually installing the system. Advanced planning minimizes installation time, cost, and disruption of the customer business activities.

2.1 Precautionary Information

Observe the following warnings during installation.

1. Never install telephone wiring during a lightning storm.
2. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
3. Never touch uninsulated telephone wires or terminals unless the telephone line is disconnected at the network interface.
4. Use caution when installing or modifying telephone lines.

2.2 Surveying the Customer Site

In most cases, a survey of the customer site is necessary to determine the proper placement of the Main Distribution Frame (MDF), the exact dimensions of the area selected for the MDF, cabling requirements, and possible Intermediate Distribution Frame (IDF) locations.

The information obtained at the customer site permits the installer to partially assemble the MDF before installing it at the customer premise. This reduces installation time and downtime at the customer site.

2.3 Selecting the Best Location for Proper Installation

2.3.1 Selecting the KSU Installation Site

When a site is selected for the installation of the KSU, consider the following conditions to ensure proper installation.

- The KSU is wall mounted to protect against accident or flooding.
- The KSU should not be located directly beneath pipes. Leaks or condensation could damage the Electra Elite 48 system equipment.
- The area where the KSU is located must be free of corrosive and inflammable gases, excessive chemical or industrial dusts, and other materials that could cause a hazard to personnel or to the proper functioning of the equipment.
- The operating ambient temperature and humidity must be within the limits specified in 4.2.2 Environmental Conditions in Chapter 2 System Specifications.
- System operation is virtually noiseless and allows wide selection of installation sites. Ensure that the KSU does not present a hazard to office traffic. To minimize cabling costs, a centralized location should be chosen.
- The KSU must be located where it can easily be connected to a dedicated AC power source.
- Connect the KSU **only** to a dedicated AC receptacle that is not being used for any other device such as a computer, copier, or facsimile machine.

2.3.2 Selecting a Permanent MDF Location

When selecting a permanent site for the MDF, the technician may encounter some of the following situations.

- Space is Limited but must be used.
- The available space may have one or more environmental hazards.
- The proposed location has poor lighting or lacks a suitable ground for the KSU.

The technician that encounters these situations must provide the best possible solution for installing the equipment. This document cannot cover all possible situations, precautions, and actions.

2.3.3 Selecting a Site for Installing the Telephones

When a site is selected for the installation of the telephones, consider the following conditions to ensure proper installation.

- Ensure that the cable length and line resistance (loop), between the KSU and the telephones, comply with the specifications shown in Table 2-3 Multiline Terminal Loop Resistance and Cable Length.
- Select a place where devices that require an external power supply can be easily connected to an AC outlet.

2.4 Constructing the Main Distribution Frame (MDF)

The Main Distribution Frame (MDF) consists of two different standard quick-connect terminal blocks that are mounted on a 3/4” plywood backboard. Mounting these blocks on standoffs for ease of access is recommended. The recommended blocks are 66B50 for termination of the MDF Cable Assembly and 66M50 for termination of the station cables.

The Intermediate Distribution Frame (IDF) requires the 66M50 blocks only.

Both the MDF and the IDF use standard bridging clips for each terminal block. The bridging clips mate the left half of the terminal block (terminated cable run) to the right half of the terminal block (crossconnection wire) to the terminal block (crossconnection wire). The bridging clips are also useful during troubleshooting to help isolate the cable runs and terminals/telephones from the central equipment and the Central Office Network from the system. Refer to Figure 4-1 Typical Full MDF Layout.

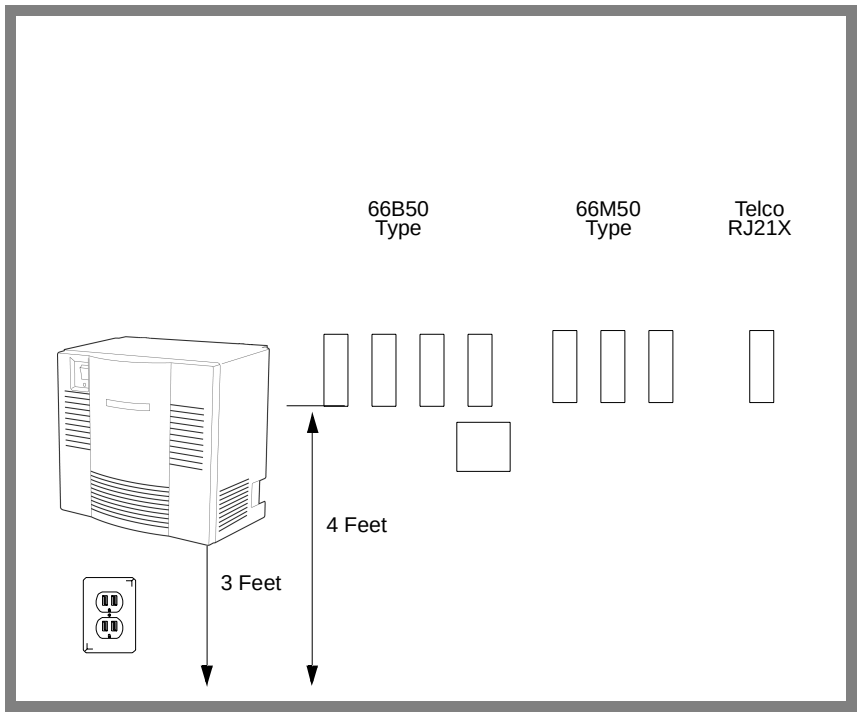


Figure 4-1 Typical Full MDF Layout

The Electra Elite 48 KSU is connected to each Multiline Terminal and Single Line Telephone, optional equipment, CO/PBX, DID, ISDN, 4-wire E&M Tie lines (Types I and V), and FT1 trunks by separate twisted-pair cable through the MDF. The 4-wire E&M Tie lines, FT1 lines, and ISDN lines require multiple twisted-pair cabling. Table 4-1 MDF Cable Connections provides the necessary cabling information.

Table 4-1 MDF Cable Connections

	MDF Pin No	Running Cable	Station Cable DTU	Station Cable ETW	ESI	SLI (8)	SLI (4)	OPX	COI/ COID (8)	COI, COIB, or COID (4)	DID	TLI	DTI/ PRT	BRT	ECR	DPH	BSU (2)
	AMPHENOL 1																
SLOT 1	26	WH–BL	GN	BK	T	—	—	—	—	—	—	—	—	—	—	—	
	1	BL–WH	RD	YL	R	—	—	—	—	—	—	—	—	—	—	—	
	27	WH–OR	GN	BK	T	—	—	—	—	—	—	—	—	—	—	—	
	2	OR–WH	RD	YL	R	—	—	—	—	—	—	—	—	—	—	—	
	28	WH–GN	GN	BK	T	—	—	—	—	—	—	—	—	—	—	—	
	3	GN–WH	RD	YL	R	—	—	—	—	—	—	—	—	—	—	—	
	29	WH–BR	GN	BK	T	—	—	—	—	—	—	—	—	—	—	—	
	4	BR–WH	RD	YL	R	—	—	—	—	—	—	—	—	—	—	—	
	30	WH–SL	GN	BK	T	—	—	—	—	—	—	—	—	—	—	—	
	5	SL–WH	RD	YL	R	—	—	—	—	—	—	—	—	—	—	—	
	31	RD—BL	GN	BK	T	—	—	—	—	—	—	—	—	—	—	—	
	6	BL–RD	RD	YL	R	—	—	—	—	—	—	—	—	—	—	—	
	32	RD-OR	GN	BK	T	—	—	—	—	—	—	—	—	—	—	—	
	7	OR–RD	RD	YL	R	—	—	—	—	—	—	—	—	—	—	—	
	33	RD–GN	GN	BK	T	—	—	—	—	—	—	—	—	—	—	—	
	8	GN–RD	RD	YL	R	—	—	—	—	—	—	—	—	—	—	—	
SLOT 3	34	RD–BR	GN	BK	T	T	T	T	T	T	T	GND	TA*	TA-1	EP Zone 3	DP 1	ZT II 1
	9	BR–RD	RD	YL	R	R	R	R	R	R	R	—	TB*	TB-1			
	35	RD–SL	GN	BK	T	T	T	T	T	T	T	E-1	RA*	RA-1	EP Zone 2	DP 2	
	10	SL–RD	RD	YL	R	R	R	R	R	R	R	M-1	RB*	RB-1			
	36	BK–BL	GN	BK	T	T	T	—	T	T	T	T-1	—	TA-2	EP Zone 1	DP 3	ZT II 2
	11	BL–BK	RD	YL	R	R	R	—	R	R	R	R-1	—	TB-2			
	37	BK–OR	GN	BK	T	T	T	—	T	T	T	T1-1	—	RA-2	Night Chime	DP 4	
	12	OR–BK	RD	YL	R	R	R	—	R	R	R	R1-1	—	RB-2			
	38	BK–GN	GN	BK	T	T	—	—	T	—	—	GND	—	TA-3	Ext. Tone Ringer 4	DLR 1	
	13	GN–BK	RD	YL	R	R	—	—	R	—	—	—	—	TB-3			
	39	BK–BR	GN	BK	T	T	—	—	T	—	—	E-2	—	RA-3	Ext. Tone Ringer 3	DLR 2	
	14	BR–BK	RD	YL	R	R	—	—	R	—	—	M-2	—	RB-3			
	40	BK–SL	GN	BK	T	T	—	—	T	—	—	T-2	—	TA-4	Ext. Tone Ringer 2	DLR 3	
	15	SL–BK	RD	YL	R	R	—	—	R	—	—	R-2	—	TB-4			
	41	YL–BL	GN	BK	T	T	—	—	T	Fax	—	T1-2	—	RA-4	Ext. Tone Ringer 1	DLR 4	
	16	BL–YL	RD	YL	R	R	—	—	R	Brch	—	R1-2	—	RB-4			

* S8000 or higher

Table 4-1 MDF Cable Connections (Continued)

	MDF Pin No	Running Cable	Station Cable DTU	Station Cable ETW	ESI	SLI (8)	SLI (4)	OPX	COI/ COID (8)	COI, COIB, or COID (4)	DID	TLI	DTI/ PRT	BRT	ECR	DPH	BSU (2)
SLOT 4	42	YL–OR	GN	BK	T	T	T	T	T	T	T	GND	TA	TA-1	EP Zone 3	DP 1	ZT II 1
	17	OR–YL	RD	YL	R	R	R	R	R	R	R	—	TB	TB-1			
	43	YL–GN	GN	BK	T	T	T	T	T	T	T	E-1	RA	RA-1	EP Zone 2	DP 2	
	18	GN–YL	RD	YL	R	R	R	R	R	R	R	M-1	RB	RB-1			
	44	YL–BR	GN	BK	T	T	T	—	T	T	T	T-1	—	TA-2	EP Zone 1	DP 3	ZT II 2
	19	BR–YL	RD	YL	R	R	R	—	R	R	R	R-1	—	TB-2			
	45	YL–SL	GN	BK	T	T	T	—	T	T	T	T1-1	—	RA-2	Night Chime	DP 4	
	20	SL–YL	RD	YL	R	R	R	—	R	R	R	R1-1	—	RB-2			
	46	VI–BL	GN	Bk	T	T	—	—	T	—	—	GND	—	TA-3	Ext. Tone Ringer 4	DLR 1	
	21	BL–VI	RD	YL	R	R	—	—	R	—	—	—	—	TB-3			
	47	VI–OR	GN	BK	T	T	—	—	T	—	—	E-2	—	RA-3	Ext. Tone Ringer 3	DLR 2	
	22	OR–VI	RD	YL	R	R	—	—	R	—	—	M-2	—	RB-3			
	48	VI–GN	GN	BK	T	T	—	—	T	—	—	T-2	—	TA-4	Ext. Tone Ringer 2	DLR 3	
	23	GN–VI	RD	YL	R	R	—	—	R	—	—	R-2	—	TB-4			
	49	VI–BR	GN	BK	T	T	—	—	T	Fax	—	T1-2	—	RA-4	Ext. Tone Ringer 1	DLR 4	
	24	BR–VI	RD	YL	R	R	—	—	R	Brch	—	R1-2	—	RB-4			
	50	TO CO MDF FOR PFT													—	—	
	25																

☞ Slot 1 is ESI(8)-U( ) built-in on the MBD-U10 Unit.
☞ Slots 2 and 7 do not have MDF connections. These slots can be used for VRS, PBR, or VDH.

Table 4-1 MDF Cable Connections (Continued)

	MDF Pin No	Running Cable	Station Cable DTU	Station Cable ETW	ESI	SLI (8)	SLI (4)	OPX	COI/ COID (8)	COI, COIB, or COID (4)	DID	TLI	DTI/ PRT	BRT	ECR	DPH	BSU (2)
	AMPHENOL 2																
SLOT 5	26	WH–BL	GN	BK	T	T	T	T	T	T	T	GND	TA*	—	EP Zone 3	DP 1	ZT II 1
	1	BL–WH	RD	YL	R	R	R	R	R	R	R	—	TB*	—			
	27	WH–OR	GN	BK	T	T	T	T	T	T	T	E-1	RA*	—	EP Zone 2	DP 2	
	2	OR–WH	RD	YL	R	R	R	R	R	R	R	M-1	RB*	—			
	28	WH–GN	GN	BK	T	T	T	—	T	T	T	T-1	—	—	EP Zone 1	DP 3	ZT II 2
	3	GN–WH	RD	YL	R	R	R	—	R	R	R	R-1	—	—			
	29	WH–BR	GN	BK	T	T	T	—	T	T	T	T1-1	—	—	Night Chime	DP 4	
	4	BR–WH	RD	YL	R	R	R	—	R	R	R	R1-1	—	—			
	30	WH–SL	GN	BK	T	T	—	—	T	—	—	GND	—	—	Ext. Tone Ringer 4	DLR 1	ZT II 1
	5	SL–WH	RD	YL	R	R	—	—	R	—	—	—	—	—			
	31	RD—BL	GN	BK	T	T	—	—	T	—	—	E-2	—	—	Ext. Tone Ringer 3	DLR 2	
	6	BL–RD	RD	YL	R	R	—	—	R	—	—	M-2	—	—			
	32	RD-OR	GN	BK	T	T	—	—	T	—	—	T-2	—	—	Ext. Tone Ringer 2	DLR 3	ZT II 2
	7	OR–RD	RD	YL	R	R	—	—	R	—	—	R-2	—	—			
	33	RD–GN	GN	BK	T	T	—	—	T	Fax	—	T1-2	—	—	Ext. Tone Ringer 1	DLR 4	
	8	GN–RD	RD	YL	R	R	—	—	R	Brch	—	R1-2	—	—			
SLOT 6	34	RD–BR	GN	BK	T	T	T	T	T	T	T	GND	TA*	—	EP Zone 3	DP 1	
	9	BR–RD	RD	YL	R	R	R	R	R	R	R	—	TB*	—			
	35	RD–SL	GN	BK	T	T	T	T	T	T	T	E-1	RA*	—	EP Zone 2	DP 2	
	10	SL–RD	RD	YL	R	R	R	R	R	R	R	M-1	RB*	—			
	36	BK–BL	GN	BK	T	T	T	—	T	T	T	T-1	—	—	EP Zone 1	DP 3	
	11	BL–BK	RD	YL	R	R	R	—	R	R	R	R-1	—	—			
	37	BK–OR	GN	BK	T	T	T	—	T	T	T	T1-1	—	—	Night Chime	DP 4	
	12	OR–BK	RD	YL	R	R	R	—	R	R	R	R1-1	—	—			
	38	BK–GN	GN	BK	T	T	—	—	T	—	—	GND	—	—	Ext. Tone Ringer 4	DLR 1	
	13	GN–BK	RD	YL	R	R	—	—	R	—	—	—	—	—			
	39	BK–BR	GN	BK	T	T	—	—	T	—	—	E-2	—	—	Ext. Tone Ringer 3	DLR 2	
	14	BR–BK	RD	YL	R	R	—	—	R	—	—	M-2	—	—			
	40	BK–SL	GN	BK	T	T	—	—	T	—	—	T-2	—	—	Ext. Tone Ringer 2	DLR 3	
	15	SL–BK	RD	YL	R	R	—	—	R	—	—	R-2	—	—			
	41	YL–BL	GN	BK	T	T	—	—	T	Fax	—	T1-2	—	—	Ext. Tone Ringer 1	DLR 4	
	16	BL–YL	RD	YL	R	R	—	—	R	Brch	—	R1-2	—	—			

* S8000 or higher

Table 4-1 MDF Cable Connections (Continued)

	MDF Pin No	Running Cable	Station Cable DTU	Station Cable ETW	ESI	SLI (8)	SLI (4)	OPX	COI/ COID (8)	COI, COIB, or COID (4)	DID	TLI	DTI/ PRT	BRT	ECR	DPH	BSU (2)
SLOT 7	42	YL–OR	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	17	OR–YL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	43	YL–GN	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	18	GN–YL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	44	YL–BR	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	19	BR–YL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	45	YL–SL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	20	SL–YL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	46	VI–BL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	21	BL–VI	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	47	VI–OR	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	22	OR–VI	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	48	VI–GN	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	23	GN–VI	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	49	VI–BR	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	24	BR–VI	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	50	EXTERNAL PAGE OUTPUT															
	25																

☞ Slots 2 and 7 do not have MDF connections. These slots can be used for VRS, PBR, VDH, CNF, or VMS.

2.5 Power Failure Transfer

The Power Failure Transfer relay is located in the KSU. When selecting a Single Line Telephone for power failure transfer, make sure it matches the CO line dialing type (10 pps, 20 pps, or DTMF) where it is connected. A Single Line Telephone with a ground button must be used with Ground Start Trunks. Refer to Figure 4-2 Power Failure Transfer Connection to SLT.

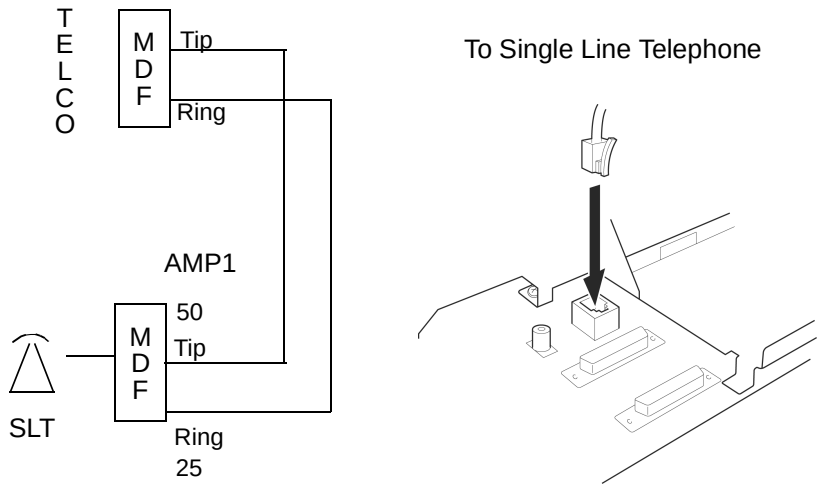


Figure 4-2 Power Failure Transfer Connection to SLT

2.6 Fax CO Branch Connection

This connection is made to the fourth port on any COI(4)-U( ), COIB(4)-U( ), or COID(4)-U( ) ETU. Refer to Figure 4-3 Fax CO Branch Connection. The facsimile machine is connected to the eighth port for the specified slot where COI(4)-U( ), COIB(4)-U( ), or COID(4)-U( ) ETU is installed.

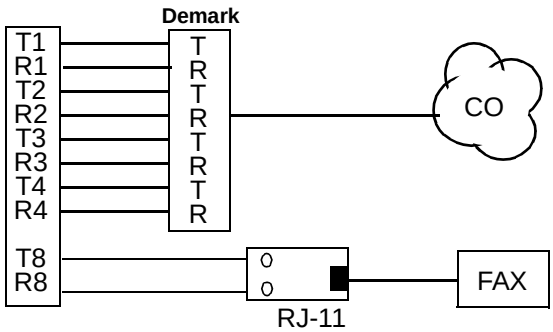


Figure 4-3 Fax CO Branch Connection

SECTION 3
INSTALLING THE KSU

The compact design of the Electra Elite 48 KSU provides easy installation. The KSU is wall mounted only.

Before installing the system; observe the following precautions.

- ✆ Ensure that the Power Supply Unit (PSU) is **OFF** and that the power cord is disconnected from the AC outlet.
- ✆ Do not touch the soldered surfaces of the ETUs with your hands.

3.1 General Information

3.1.1 KSU

The B48-U10 KSU provides service for outside lines, Attendant Consoles, and interconnection of the station terminals. The B48-U10 KSU provides 48 ports and has one fixed and six flexible slots. Fixed slot 1 is reserved for the ESI(8)-U( ) ETU that is built-in on the MBD-U10 Unit. A P64-U10 Power Supply Unit (PSU) and backup batteries are provided with the KSU.

3.2 Removing the KSU Cover

The front cover must be removed to access the battery, cables, and ETU slots.

1. Loosen the screws near the bottom of the KSU. Do not remove screws from the unit.

2. Pull the front cover off toward you.

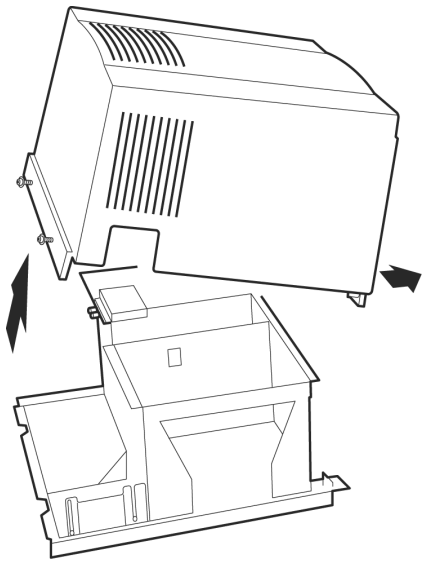


Figure 4-4 Removing the Cover of the KSU

3.3 Securing Cables Using the Velcro Strap

When attaching the amphenol cables to the side of the KSU, they can be secured using the provided velcro strap. This should be done prior to attaching the KSU to the wall mount bracket. Thread the velcro strap through the hook on the back side of the KSU.

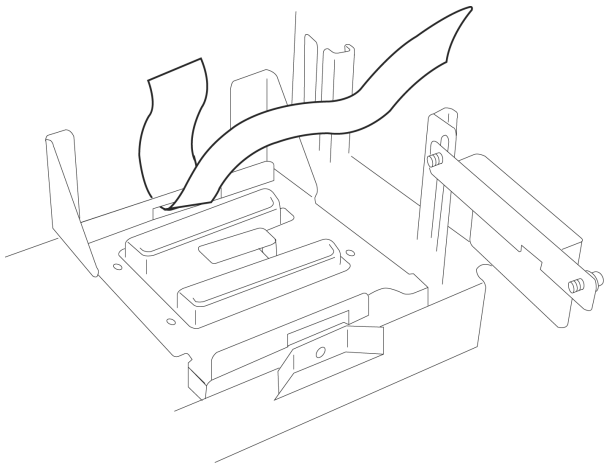


Figure 4-5 Threading the Velcro Strap Through the Hook on the KSU

3.4 Wall Mounting the KSU

1. Use the template, and attach two of the four locally provided screws to the wall as shown in Figure 4-6 Using the Template. Do not thread in the last 1/8 inch of the screws.

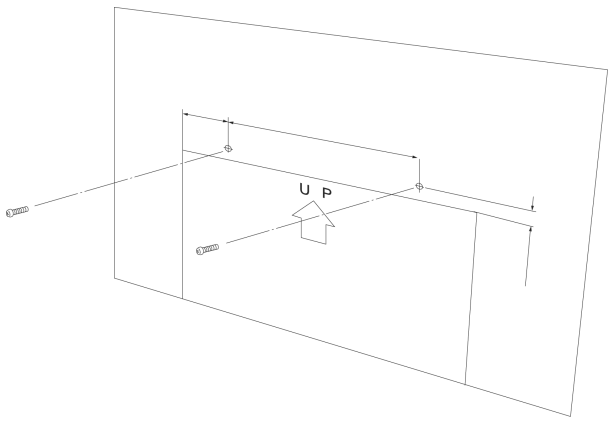


Figure 4-6 Using the Template

2. Hang the KSU as shown in Figure 4-7 Hanging the KSU.

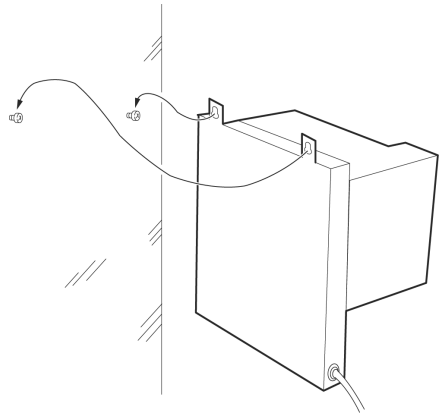


Figure 4-7 Hanging the KSU

3. Install screws in bottom of KSU and tighten screws at the top.

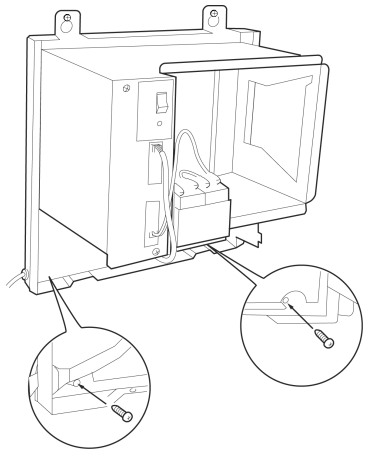


Figure 4-8 Installing Screws

3.4.1 Grounding Requirements

The KSU must be properly grounded. The Electra Elite 48 KSU is provided with a typical ac third-wire ground. When this ground is questionable, provide an alternative ground.

1. Connect the grounding cable (green wire) to the ground terminal on the right side of the KSU. *The locally provided grounding cable AWG must be greater than #16.*

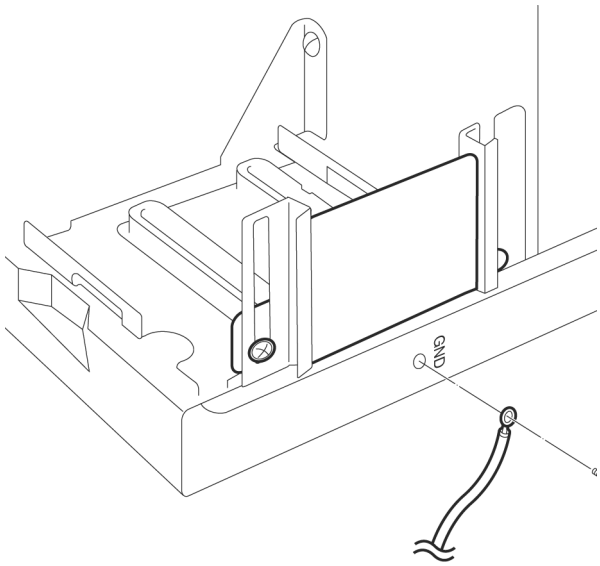


Figure 4-9 KSU Grounding

2. Provide a suitable ground inside of a building according to local telephone company procedures.

3. When no suitable ground is available, a ground rod should be installed in accordance with the operating procedures of the local telephone company.

3.5 Rack Mounting the KSU

1. Mount the RAK-U10 Unit to the equipment rack using the six provided screws. Refer to Figure 4-10 RAK-U10 Unit and KSU. Use three screws on each side (at **1**, **2**, and **3**).

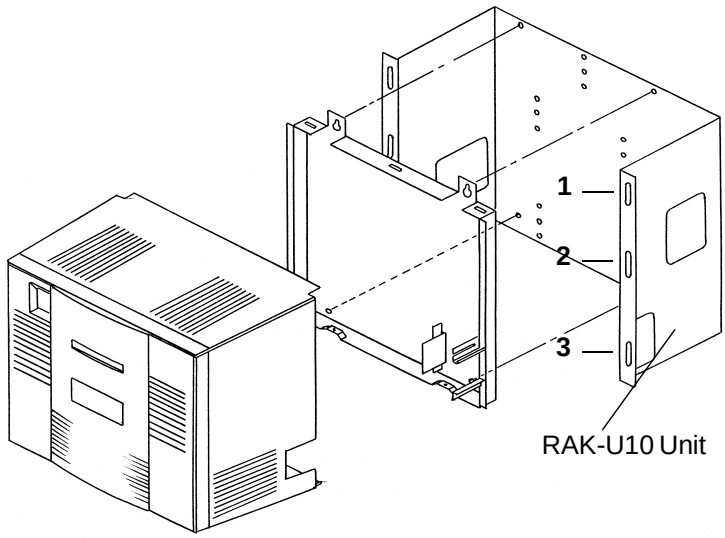


Figure 4-10 RAK-U10 Unit and KSU

2. Install two provided screws into the upper holes (at **D**) on the RAK-U10 Unit. Refer to Figure 4-11 Mounting KSU on the RAK-U10 Unit. *Do not thread screws in the last 1/8 inch*.

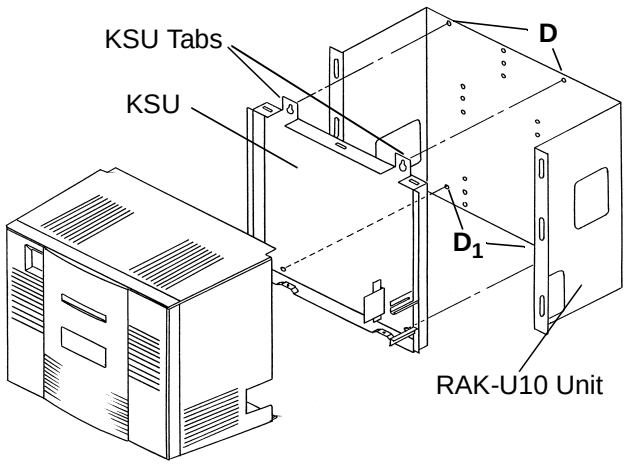


Figure 4-11 Mounting KSU on the RAK-U10 Unit

3. Hang the two metal KSU tabs on the screws just installed.

4. Install two screws in the lower holes of the KSU (at **D_1**). Refer to Figure 4-11 Mounting KSU on the RAK-U10 Unit.

5. Tighten the four screws to secure the KSU to the RAK-U10 Unit.

3.6 Replacing the Power Supply Unit in the KSU

The Electra Elite 48 system has a P64-U10 PSU with a battery backup interface that accepts 117 Vac and outputs +5V and –24V to the system.

Before replacing the PSU, remove the defective PSU and verify that the power cord on the replacement PSU is unplugged.

1. Disconnect power cord from P64-U10 PSU AC IN Connector.

2. Remove two screws from front of PSU.

3. Pull out the power supply, and disconnect the white cable attached to the MBD-U10 Unit from the PSU. Refer to Figure 4-12 Disconnecting Cable from the PSU.

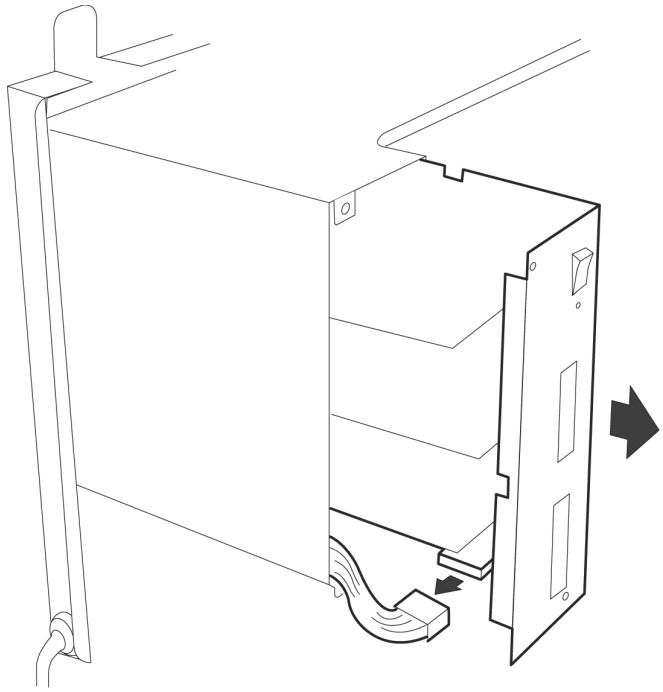


Figure 4-12 Disconnecting Cable from the PSU

4. Refer to Figure 4-13 Installing the PSU in the KSU. Install the P64-U10 PSU into the left space of the KSU, connect the white cable attached to MBD-U10 Unit, and attach the PSU to the KSU using the two screws removed in Step 1.

5. Connect the power cord to the AC IN connector.

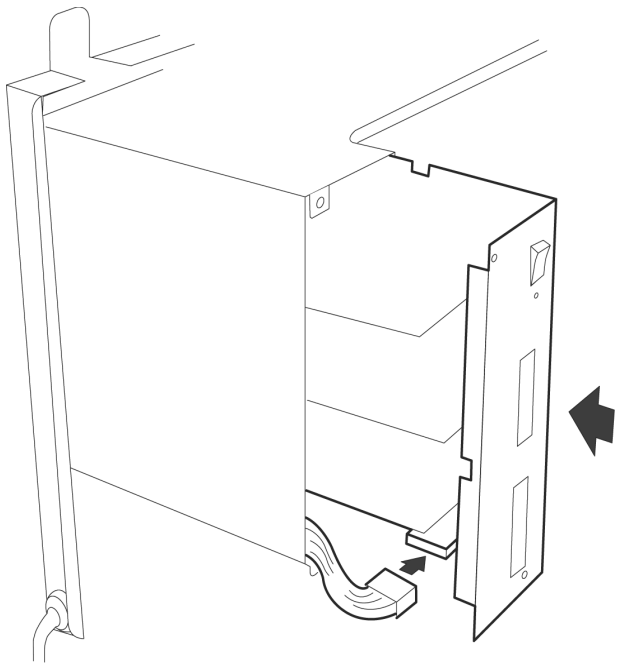


Figure 4-13 Installing the PSU in the KSU

3.7 Fuse Replacement

For continued protection against risk of fire, replace fuses with the same type and rating originally installed.

1. Disconnect AC power, and remove the front cover on the KSU. Refer to Figure 4-4 Removing the Cover of the KSU.
2. Loosen two screws on the removable access plate to the left of the PSU, and remove the plate.
3. Replace the fuses as necessary. Refer to Figure 4-14 PSU Fuse Replacement. Fuse **F1** is a 125V, 6A fuse for AC input. Fuse **F101** is a 125V, 6.0A fuse for DC input.

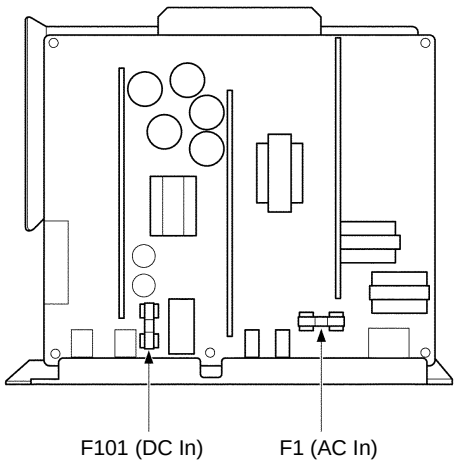


Figure 4-14 PSU Fuse Replacement

4. Install the access plate, and tighten the screws.

3.8 Installing Built-In and External Batteries in the KSU

3.8.1 Built-In Battery Installation

1. Connect the two batteries in series as shown in Figure 4-15 Connecting Built-In Batteries. The red cord attaches to the **red** terminal and the black cord attaches to the **black** terminal.

Be careful not to misconnect the terminals of the batteries.

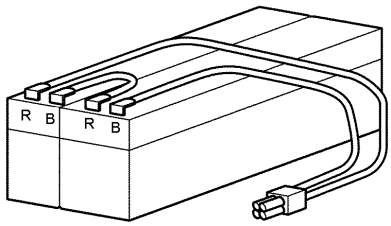


Figure 4-15 Connecting Built-In Batteries

2. Slide the batteries into the bottom space at the left side the KSU, and install the battery cover as shown in Figure 4-16 Installing Batteries in the KSU.

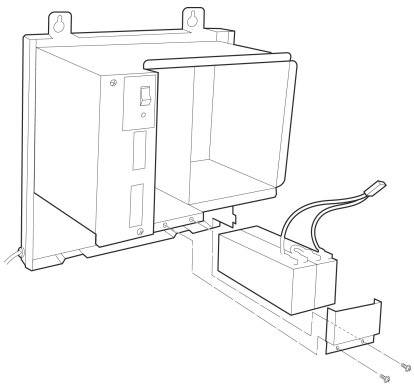


Figure 4-16 Installing Batteries in the KSU

3. Connect the cable to the **BATTERY INT** connector of the PSU as shown in Figure 4-17 Connecting the Batteries to the Power Supply Unit.

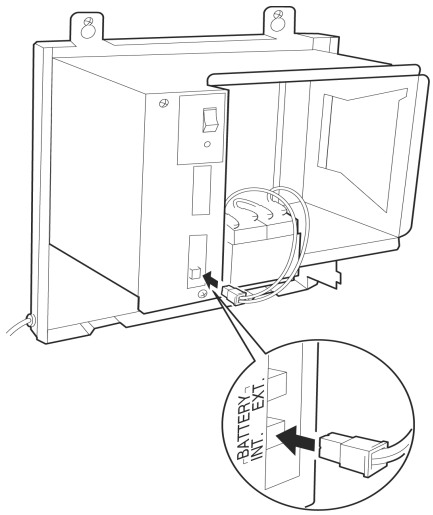


Figure 4-17 Connecting the Batteries to the Power Supply Unit

3.8.2 External Battery Installation

Batteries that are purchased locally can be connected to the system as external batteries.

When installing external batteries, disconnect the battery cable for the built-in batteries from the BATTERY EXT connector of the KSU. When the built-in batteries are connected with the external batteries, a large charging current may flow from the external batteries to the built-in batteries and cause battery cable burns.

1. Connect cabling to the external batteries as shown in Figure 4-18 Connecting Cables for External Batteries.

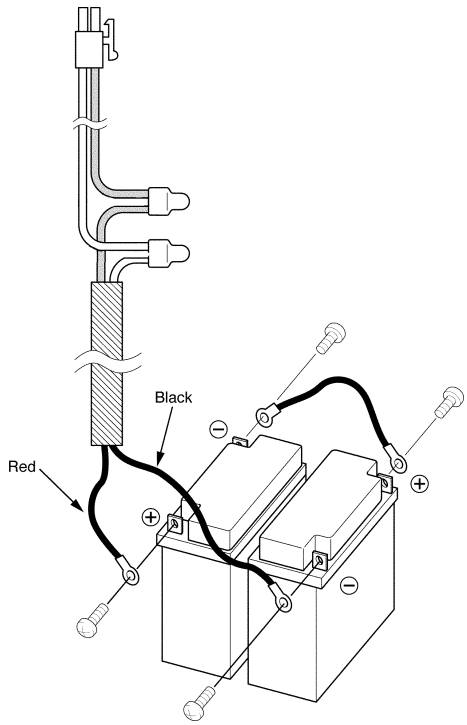


Figure 4-18 Connecting Cables for External Batteries

2. Route the cables through the clamps on the bottom right side of the KSU.

3. Connect the external batteries to the KSU in the location shown in Figure 4-19 Connecting the External Power Cables to the PSU. Connect the external battery cable to the **BATTERY EXT** connector on the PSU of the KSU. Bundle any extra cabling together.

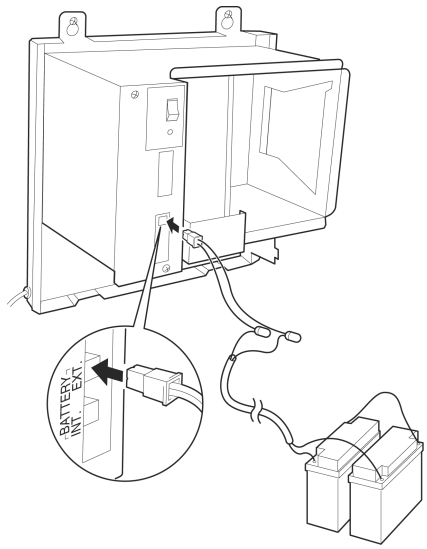


Figure 4-19 Connecting the External Power Cables to the PSU

4. Install the KSU cover. Refer to Figure 4-20 Installing the KSU Cover.

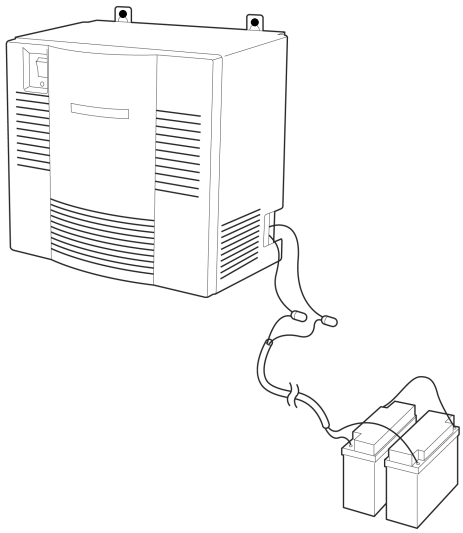


Figure 4-20 Installing the KSU Cover

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Installing Electronic Telephone Units

CHAPTER 5

SECTION 1 GENERAL INFORMATION

Each Electronic Telephone Unit (ETU) is installed in a slot of the KSU.

Refer to Figure 5-1 KSU ETU Slots. The B48-U10 KSU has seven slots that are divided as follows:

Slot 1 is a fixed ESI slot that cannot be changed.

S2 is the ISA /IF slot without Amphenol connections. Any ETU that does not require Amphenol connections (e.g. MIF, VRS, CNF, or PBR) can be installed in this slot.

S3~S6 are the B48-U10 KSU interface slots with Amphenol connectors. All other interface ETUs can be installed in any of these slots.

S7 is an interface slot without Amphenol connections. Any ETU that does not require Amphenol connections (*e.g.*, VRS or PBR) can be installed in this slot.

This chapter describes each ETU and the installation procedures.

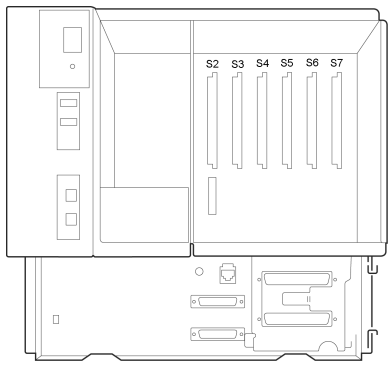


Figure 5-1 KSU ETU Slots

SECTION 2
INSTALLATION

2.1 Installation Precautions

Observe the following precautions when installing the ETUs to avoid static electricity damage to hardware or exposure to hazardous voltages.

- The ETUs used in this system make extensive use of CMOS technology that is very susceptible to static; therefore, extreme care must be taken to **avoid static discharge** when handling ETUs.
- Make all switch setting changes on the ETU before inserting it in the KSU.
- When installed, the component side of all ETUs must face the left side of the KSU. Ejector tabs are always on top.
- When carrying an ETU be sure to keep it in a conductive polyethylene bag to prevent damage due to static electricity.
- When handling an ETU the installer must wear a grounded wrist strap to protect the ETU from static electricity.
- When inserting or removing an ETU, be sure the wrist strap is connected to the Frame Ground Terminal on the KSU. Refer to Figure 5-2 Wrist Strap Grounding.

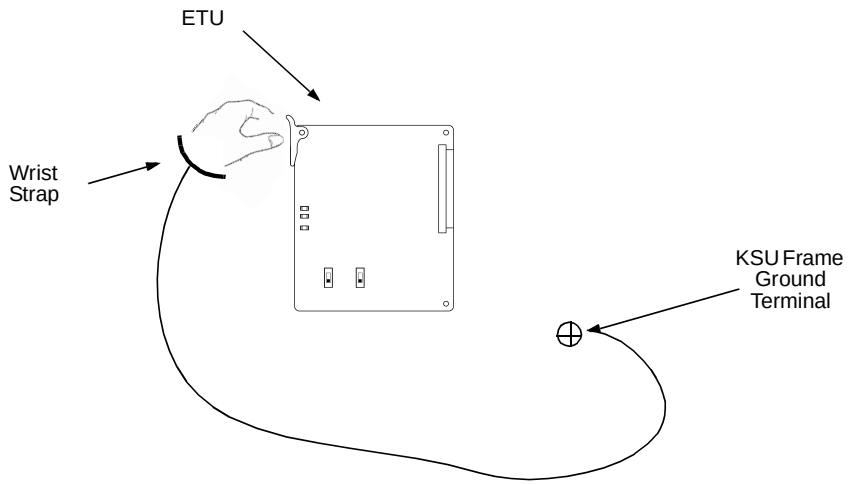


Figure 5-2 Wrist Strap Grounding

- When holding an ETU be sure you do not touch the components or the soldered surfaces with bare hands. Place one hand under the bottom corner of the ETU and with the other hand hold the ejector tab (located in the top corner of the ETU).

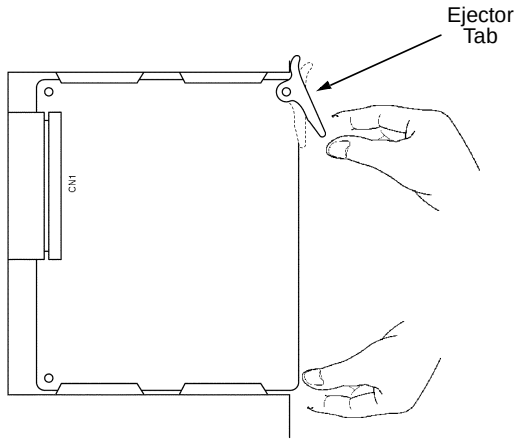


Figure 5-3 Handling an ETU

- When setting switches on the ETU, wear a wrist strap and stand on a grounded conductive work surface to avoid static electricity.

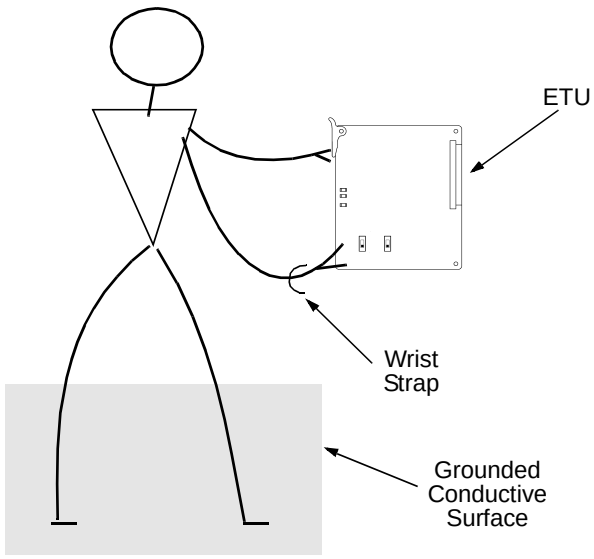


Figure 5-4 Safety Precautions when Setting Switches on an ETU

✆ Don’t touch the surface of the ETU. A small screw driver can be used to change the switch settings if the installer follows the recommended safety precautions.

2.2 Inserting an ETU into the KSU Slots

1. Align ETU with ejector tab at top and component side to the left.

2. Slide the ETU into the proper slot in the KSU, and push it all the way to the back of the KSU.

2.3 Removing an ETU from the KSU

1. Lift the ejector tab on the ETU.

2. Pull the ETU out of the slot.

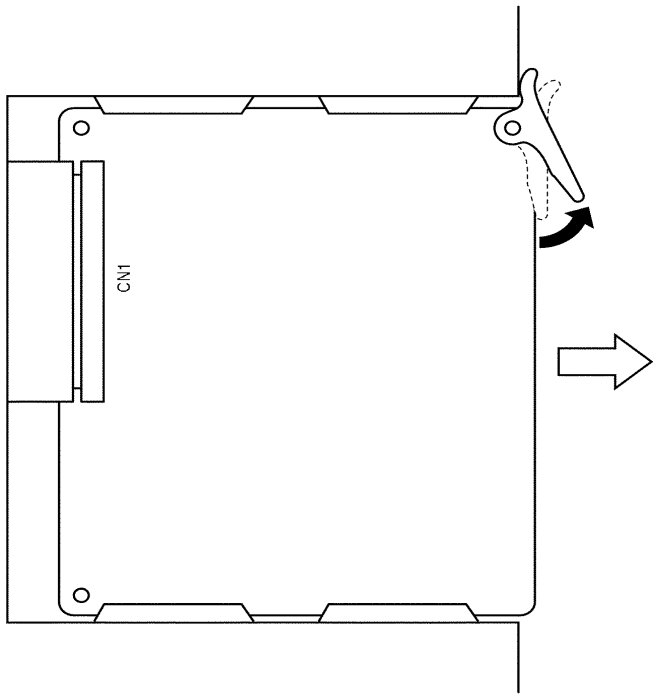


Figure 5-5 Lifting the Ejector Tabs on the ETU

SECTION 3 COMMON CONTROL UNITS

The Electronic Telephone units described in this section control the common functions of the KSU.

3.1 CLKG-U( ) Unit

3.1.1 Description

The CLKG-U( ) Unit provides clock synchronization for ISDN-PRI, FT1, ISDN-BRI, and Wireless lines that are connected to the system.

This unit works with the DTI-U( ) BRT(4)-U( ), PRT(1)-U( ) or BSU(2)-U( ) ETU and is installed on the MBD-U10 Unit.

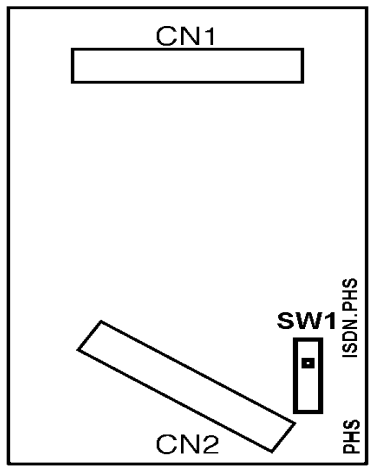


Figure 5-6 CLKG-U( ) Unit

3.1.2 Installation

Only one CLKG-U( ) Unit can be installed.

3.1.3 Connectors

The following connectors are located on the CLKG-U( ) Unit.

- CN1 Connects to CN5 on the MBD-U10 Unit
- CN2 Connects to CN6 on the MBD-U10 Unit

3.1.4 Switch Settings

Leave SW1 set to **ISDN.PHS** when ISDN/T1 or ISDN/T1 and Wireless trunks are installed.

When only Wireless is installed, set SW1 to **PHS**.

3.2 KMM(1.0)U

3.2.1 Description

The KMM(1.0)U is a feature module that mounts on the MIFM-U( ) ETU. This unit is required when LCR or Caller ID scrolling and dialing features are used.

3.2.2 Installation

Like all ICs, this unit has a notch on one side. Find the notch on the IC6 silkscreen, and align the KMM(1.0)U so that the notches are on the same side before mounting.

3.3 MBD-U10 Unit for B48-U10 KSU

3.3.1 Description

The MBD-U10 Unit (installed on the B48-U10 KSU) is the Central Processing Unit for the system. This Unit has a Central Processing Unit and a Microprocessing Unit and supports a maximum of 48 ports for the Electra Elite 48 system. Refer to Figure 5-7 KSU MBD-U10 Unit.

A 32-bit microprocessor executes the programs stored on the Flash ROM ICs of the MBD-U10 Unit. This controls the entire system when data is transferred to and from other ETUs.

This ETU includes the following items:

- Time Division Switch (TDSW)
- Static Random Access Memory (SRAM)
- 32-bit Processor
- 4-channel DTMF Receiver (PBR)
- Six 4-party Conference Circuits
- Internal (digital music) Music-on-Hold source
- External Music-on-Hold input (also used for station background music)
- Flash ROM
- Call Progress and DTMF Tone Generator
- Memory Backup Battery (Retains memory for approximately 21 days)
- Key Function (KF)/Multifunction (MF) Registration

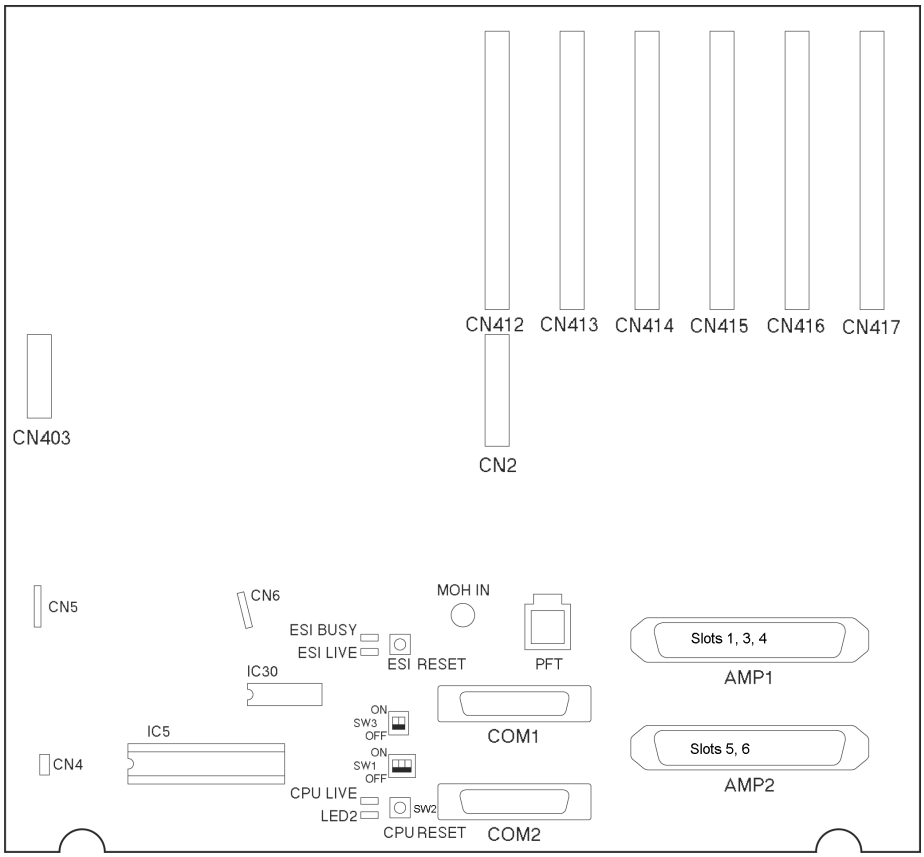


Figure 5-7 KSU MBD-U10 Unit

3.3.2 Switch Settings

Refer to Table 5-1 MBD-U10 Unit Default Switch Settings.

Table 5-1 MBD-U10 Unit Default Switch Settings

SW1-1	SW1-2	Description
Off	Off	Normal Operation
On	Off	Flash ROM load from COM1 port
Off	On	Factory Test
On	On	Flash ROM load from EPROM

SW1-3	Description
Off	MF Mode
On	KF Mode

SW2	Description
Momentary Switch	CPU Reset

SW3-1	Description
On	System boot by EPROM
Off	System boot by Flash ROM

SW3-2	Description
N/A	Not Used

Pressing SW2 interrupts all service and causes a second initialization. Do not use this switch *in an operating system unless absolutely necessary.*

3.3.3 Connectors

Before programming System Data, the battery must be connected to **CN4** to allow memory retention when a power failure or brownout occurs. When a brownout or power failure does occur, and the battery backup circuit is not activated, System Data resets to the default values, all stations in the system reset to the default values, and any data programmed on individual stations is cleared.

The following connectors are located on the MBD-U10 Unit.

- MOH IN For music on hold input
- PFT For Power Failure Transfer
- COM1 For LCR/PC programming
- COM2 For SMDR
- CN4 For backup battery
- CN5 Connects to CN1 of the CLKG-U( ) Unit
- CN6 Connects to CN2 of the CLKG-U( ) Unit

3.3.4 LED Indications

Table 5-2 MBD-U10 Unit LED Indications

LED	Description	On	Flashing	Off
CPU LIVE	CPU status	Operation stopped (Power On)	Normal Operation	No Power
LED2	Power status	System Power On	Not Used	System Power Off
ESI LIVE	ESI status	Operation stopped (Power On)	Normal Operation	No Power
ESI Busy	ESI Busy status	Some Port(s) busy	Not Used	All ports idle

3.3.5 Replacing Memory Backup

The MBD-U10 Unit provides memory backup for approximately 21 days. The Ni-Cad battery should be replaced about every two years. Refer to Figure 5-8 KSU Backup Battery Replacement.

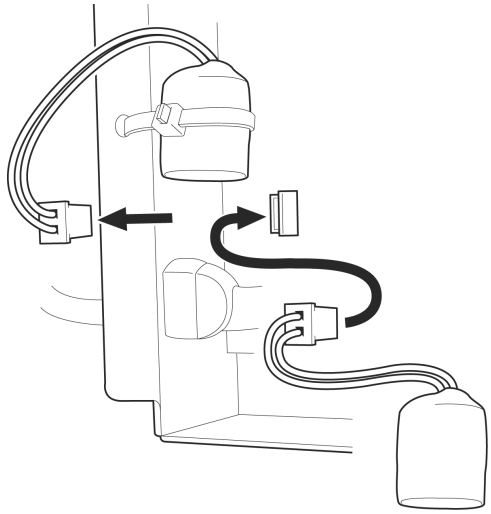


Figure 5-8 KSU Backup Battery Replacement

1. Remove the battery cable from CN4 on the MBD-U10 Unit.
2. Connect the cable from the new battery to CN4 on the MBD-U10 Unit.
3. Turn off the KSU power.
4. Use cutting tool to cut the tie wrap that fastens it, and remove the old battery.
5. Fasten the new battery with a tie wrap.
6. Turn on the KSU power.

3.4 MIFA-U( ) ETU

3.4.1 Description

The MIFA-U( ) provides additional memory and processing power to support ACD or UCD. The ACD feature and KMA(1.0)U are not supported by the Electra Elite 48 system.

The MIFA-U( )ETU must be installed in KSU Slot S2.

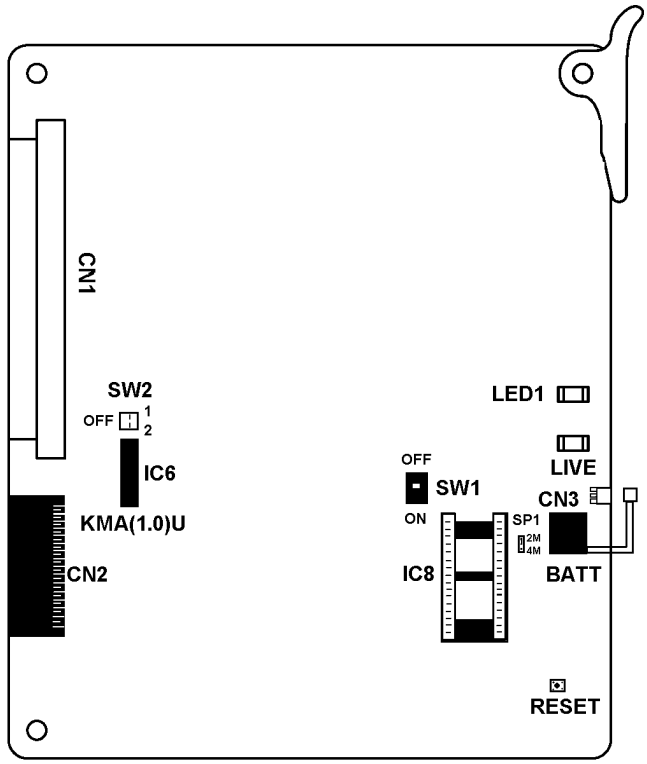


Figure 5-9 MIFA-U( ) ETU

3.4.2 Installation

Only one MIFA-U( ) ETU can be installed in the system.

☞ Slot S2 may contain either the MIFA-U( ) ETU or MIFM-U( ) ETU. The system cannot support both at the same time.

3.4.3 Switch Settings

Refer to Table 5-3 MIFA-U( ) Default Switch Settings.

Table 5-3 MIFA-U( ) Default Switch Settings

SW2-1	SW2-2	Description
Off	Off	Normal Operation
On	Off	Factory Test
Off	On	Not Used
On	On	Flash ROM load from EPROM

SW1	Description
On	System boot by Flash ROM
Off	System boot by EPROM

3.4.4 LED Indications

Table 5-4 MIFA-U( ) LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED1	Programming status	Problem when loading Flash ROM or PC or LCR Programming connected	Loading Flash ROM from EPROM	Not Used

3.4.5 Connectors

The MIFA-U( ) ETU has the following connectors:

- ✆ CN1 Connects to the Backboard
- ✆ CN2 Connects to the Backboard
- ✆ CN3 Connects the ETU backup battery during installation.
  - ☞ Disconnect to store the ETU.
- ✆ IC6 Not used by Electra Elite 48

3.5 MIFM-U( ) ETU

3.5.1 Description

This ETU provides additional memory and processing power for PC Programming, SMDR, LCR, Caller ID, or Wireless activation. PC Programming and SMDR are standard. LCR and Caller ID scrolling and dialing require the KMM(1.0)U to be mounted on the MIFM-U( ) ETU.

The MIFM-U( ) must be installed in KSU Slot S2.

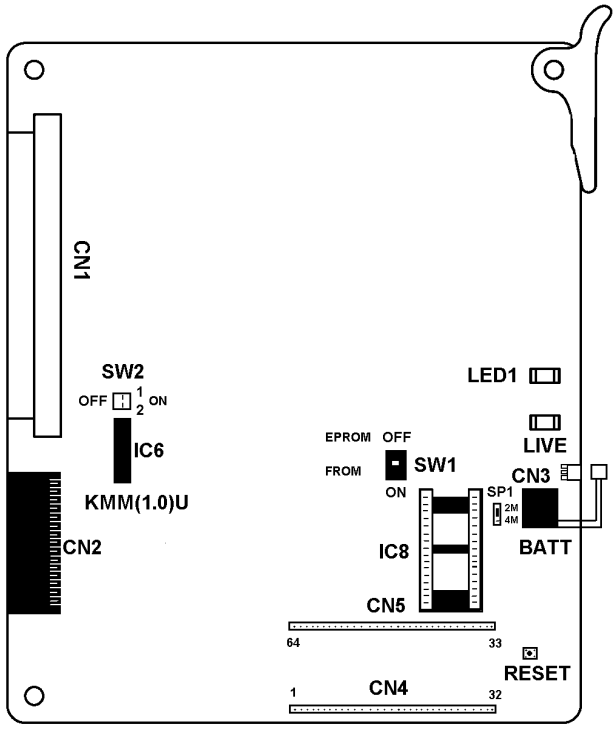


Figure 5-10 MIFM-U( ) ETU

3.5.2 Installation

Only one MIFM-U( ) ETU can be installed.

☞ Slot S2 may contain either the MIFA-U( ) ETU or MIFM-U( ) ETU. The system cannot support both at the same time.

3.5.3 Switch Settings

Refer to Table 5-5 MIFM-U( ) Default Switch Settings.

Table 5-5 MIFM-U( ) Default Switch Settings

SW2-1	SW2-2	Description
Off	Off	Normal Operation
On	Off	Factory Test
Off	On	Not Used
On	On	FROM (Flash Read Only Memory) load from EPROM (Erasable Programmable Read Only Memory)

SW1	Description
On	System boot by Flash ROM
Off	System boot by EPROM

3.5.4 LED Indications

Table 5-6 MIFM-U( ) LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED1	Programming status	Problem when loading Flash ROM or PC or LCR Programming connected	Loading Flash ROM from EPROM	Not Used

3.5.5 Connectors

The MIFM-U( ) ETU has the following connectors:

- ✆ CN1 Connects to the Backboard
- ✆ CN2 Connects to the Backboard
- ✆ CN3 Used to Connect the ETU backup battery during installation.
  - ☞ Disconnect to store the ETU.
- ✆ CN4, CN5 Connectors for the optional MIF-Modem Unit
- ✆ IC6 Socket for the optional KMM(1.0)U

SMDR and LCR/PC Programming connections are made (using COM ports) on the MBD-U10 Unit.

- ✆ COM1 LCR/PC/Wireless Programming
- ✆ COM2 SMDR

Both COM ports are standard female RS-232C DCE ports. A straight cable is required.

When an external modem is used, connect the modem to COM1 port via the modem cable adapter. A straight RS-232C cable (locally provided) is required.

3.6 Modem Kit Unit

3.6.1 Description

This optional modem mounts on the MIFM-U( ) ETU and does not require analog port connection. The MIFM-U( ) ETU must be installed in KSU Slot S2.

3.6.2 Installation

The Modem Kit Unit pins and the pins of the CN4 and CN5 socket are labeled. Align the Modem Kit Unit pins before installing the unit. Installing it backward could damage the Modem Kit Unit.

3.6.3 Specifications

ITU-T V.34

Maximum speed 28.8 Kbps

SECTION 4
TRUNK ETUS

The Electronic Telephone Unit described in this section provides a link between equipment in the Electra Elite 48 system and outside equipment. All ETUs are installed in the interface slots of the KSU.

4.1 BRT(4)-U( ) ETU

4.1.1 Description

The Basic Rate Trunk (BRT) Interface ETU terminates ISDN Basic Rate Trunk lines and supports four ISDN-BRI circuits. Each trunk supports two B channels. These eight B channels can be used for CO trunks with DTMF signaling. Tip and Ring electrical fuses are provided to comply with UL 1459 requirements.

This ETU uses an S/T-type interface. A locally provided Network Termination unit (NT1) is required to connect to a CO. Caller ID is supported.

One BRT ETU provides a maximum of four ISDN circuits that provide eight B channels to be used as trunks.

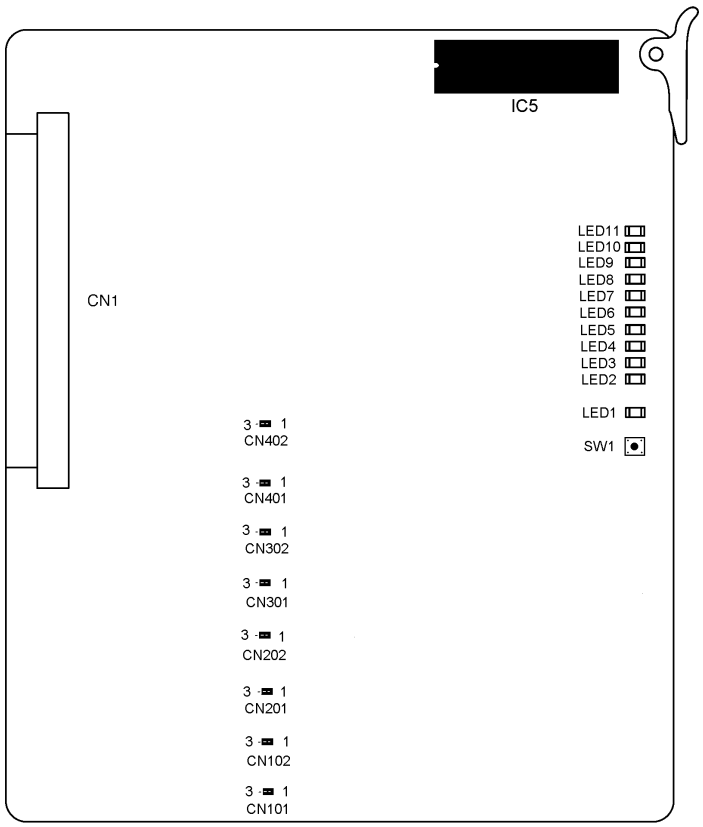


Figure 5-11 BRT(4)-U( ) ETU

4.1.2 Installation

If a BRT(4)-U( ) ETU is installed, a CLKG-U( ) Unit must be installed in connectors CN5 and CN6 on the MBD-U10 Unit.

A maximum of two BRT(4)-U( ) ETUs can be installed in the system in slot S3 or S4 (**S7000 or lower**).

Using S8000 or higher, up to two BRT(4)-U( ) ETUs can be installed in slots S3~S6.

4.1.3 Switch Settings

SW1 is the reset switch.

4.1.4 Jumpers

CN101 and CN102

✆ Set the 100Ω termination to On or Off for Channel 1.

CN101 and CN102 shorted together from the factory turn on the 100Ω terminal.

CN201 and CN202

✆ Set the 100Ω termination to On or Off for Channel 2.

CN201 and CN202 shorted together from the factory turn on the 100Ω terminal.

CN301 and CN302

✆ Set the 100Ω termination to On or Off for Channel 3.

CN301 and CN302 shorted together from the factory turn on the 100Ω terminal.

CN401 and CN402

✆ Set the 100Ω termination to On or Off for Channel 4.

CN401 and CN402 shorted together from the factory turn on the 100Ω terminal.

4.1.5 LED Indications

Table 5-7 BRT(4)-U( ) ETU LED Indications

LED	Description	On	Flashing	Off
LED1	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED2	L1 status - BRI CKT1	L1 working	Not Used	L1 idle
LED3	L1 status - BRI CKT2	L1 working	Not Used	L1 idle
LED4	L1 status - BRI CKT3	L1 working	Not Used	L1 idle
LED5	L1 status - BRI CKT4	L1 working	Not Used	L1 idle
LED6	B1 or B2 status Channel 1	Busy	Not Used	Idle
LED7	B1 or B2 status Channel 1	Busy	Not Used	Idle
LED8	B1 or B2 status Channel 1	Busy	Not Used	Idle
LED9	B1 or B2 status Channel 1	Busy	Not Used	Idle
LED10	Communication or self-diagnostics	Communication error or Self-diagnostics in progress	Not Used	Normal
LED11	Communication or self-diagnostics	Communication error or Self-diagnostics in progress	Not Used	Normal

4.1.6 Connectors

The BRT(4)-U( ) has the following connector:

✆ CN1 Connects to the backboard

4.1.7 Connections

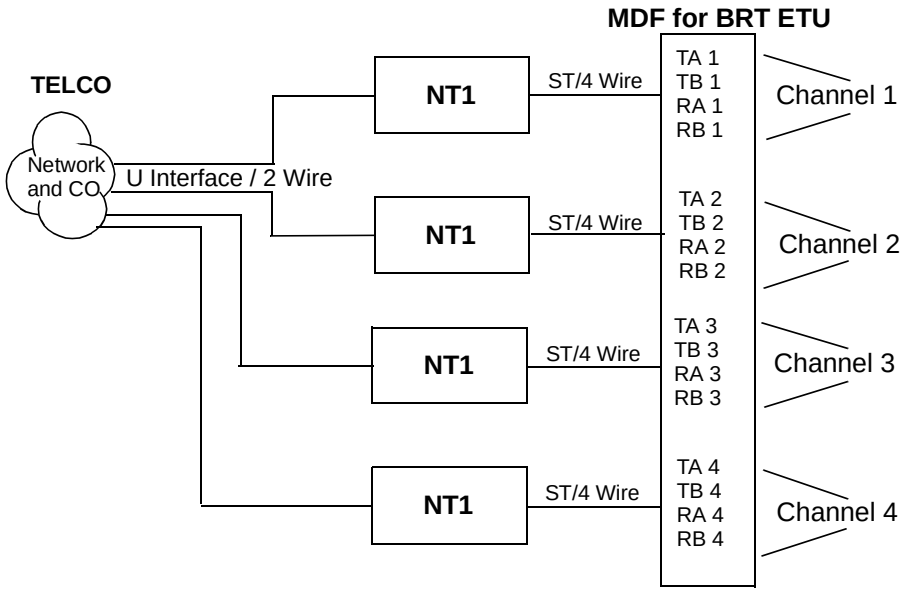


Figure 5-12 BRT(4)-U( ) ETU Connections

4.2 COI(4)/(8)-U( ) ETU

4.2.1 Description

The COI(4)/(8)-U( ) ETU provides the Central Office interface. The COI ETU contains circuitry for outside ring detection, holding, dialing, and control functions.

This ETU can provide a CAMA trunk for Enhanced E911.

The COI(8)-U( ) ETU provides identical circuits to serve up to eight CO trunks that can be any combination of Loop Start or Ground Start with DTMF signaling. The COI(4)-U( ) is for Loop Start trunks with DTMF signaling only. ETU Tip and Ring electrical fuses are provided to comply with UL 1459 requirements. Refer to Figure 5-13 COI(8)-U( ) ETU.

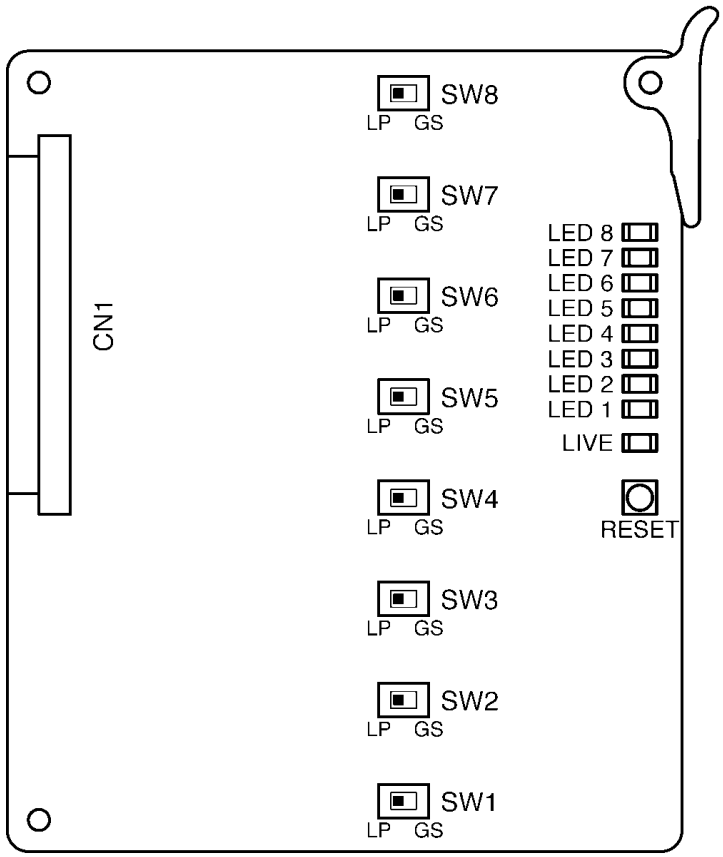


Figure 5-13 COI(8)-U( ) ETU

4.2.2 Installation

A maximum of four/two COI(4)/(8)-U( ) ETUs can be installed in the system limited by 16 trunks. The COI(4)-U( ) ETU can be installed in slots S3~S7. The COI(8)-U( ) ETU can be installed in slots S3~S6.

4.2.3 Switch Settings

Refer to Table 5-8 COI(4)/(8)-U( ) ETU Default Switch Settings.

Table 5-8 COI(4)/(8)-U( ) ETU Default Switch Settings

Switch	Setting	Description
SW1~8	Set according to the line type. Default Setting: LP	Switches between Loop Start (LP) or Ground Start (GS) Trunks on Lines 1~8 of COI(8)-U( ) ETU.
SW1~4	Loop Start Only	Loop Start for lines 1~4 of COI(4)-U( ) ETU
Reset	N/A	Resets the COI ETU

4.2.4 LED Indications

Table 5-9 COI(4)/(8)-U( ) ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED 1	Line 1 status COI(4)/COI(8)	Busy	Not Used	Idle
LED 2	Line 2 status COI(4)/COI(8)	Busy	Not Used	Idle
LED 3	Line 3 status COI(4)/COI(8)	Busy	Not Used	Idle
LED 4	Line 4 status COI(4)/COI(8)	Busy	Not Used	Idle
LED 5	Line 5 status COI(8)	Busy	Not Used	Idle
LED 6	Line 6 status COI(8)	Busy	Not Used	Idle
LED 7	Line 7 status COI(8)	Busy	Not Used	Idle
LED 8	Line 8 status COI(8)	Busy	Not Used	Idle

4.2.5 Connectors

The COI(4)/(8)-U( ) ETU has the following connector:

✆ CN1 Connects to the backboard

4.2.6 Connections

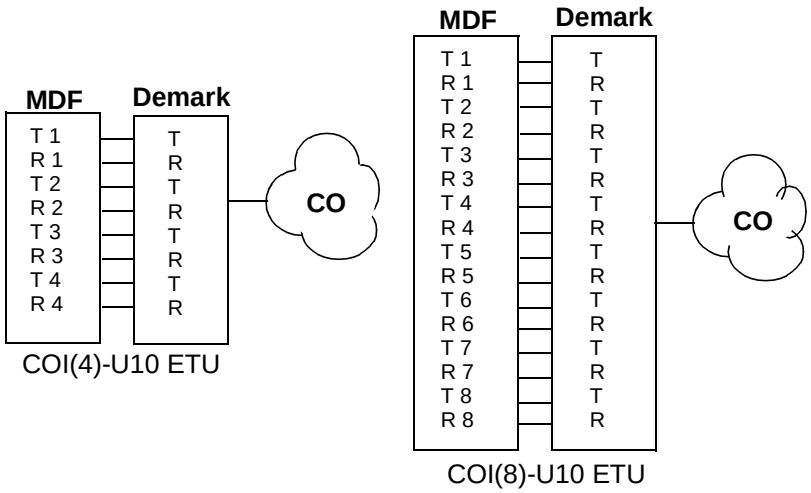


Figure 5-14 COI(4)/(8)-U( ) ETU Connections

4.3 COIB(4)-U( ) ETU

4.3.1 Description

This ETU functions the same as the COI(4)-U( ) or COID(4)-U( ) ETU to provide Central Office Interface. When the ETU is set for COID mode, Loop Start trunks and/or Caller ID trunks are supported. When the ETU is set for COI mode, Loop Start or Ground Start is supported. Caller ID is **not** supported in the COI mode. Connections for Ground Start Trunks are polarity sensitive.

This ETU contains circuitry for outside ring detection, holding, dialing, and control functions, and it can provide a CAMA trunk for E911.

When functioning as a COI(4)-U( ) or COID(4)-U( ) ETU only DTMF signaling is supported. Tip and Ring electrical fuses are provided to comply with UL 1459 requirements. Refer to Figure 5-15 COIB(4)-U( ) ETU.

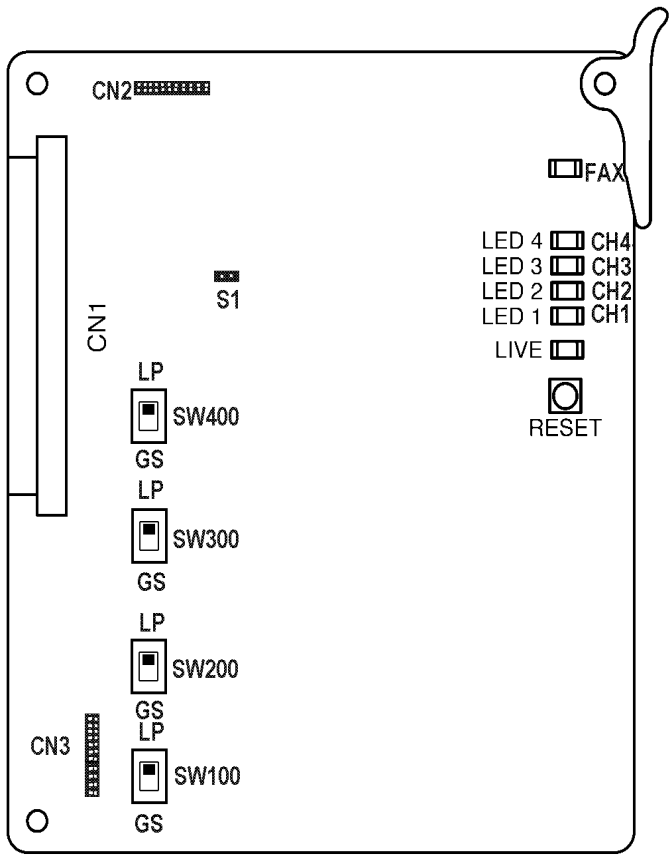


Figure 5-15 COIB(4)-U( ) ETU

4.3.2 Installation

In COI mode, a maximum of four COIB(4)-U( ) ETUs can be installed in slots S3~S6 in the system limited by 16 trunks.

When used for Caller ID trunks in COID mode, it must be installed in slot S3 or S4 (**S7000 or lower**).

For **S8000 or higher** in COID mode, the COIB(4)-U( ) ETU can be installed in slots S3~S6.

4.3.3 Switch Settings

Refer to Table 5-10 COIB(4)-U( ) ETU Default Switch Settings.

Table 5-10 COIB(4)-U( ) ETU Default Switch Settings

Switch	Setting	Description
SW100~400	Set for line type. Default Setting: LP	Switches between Loop Start (LP) or Ground Start (GS) Trunks
S1	Open for COI Shorted (default) for COID	Selects the COIB(4)-U( ) ETU function for COI or COID mode
Reset	N/A	Resets the COIB(4)-U( ) ETU

4.3.4 LED Indications

Table 5-11 COIB(4)-U( ) ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED 1/CH1	Channel 1 status	Busy	Not Used	Idle
LED 2/CH2	Channel 2 status	Busy	Not Used	Idle
LED 3/CH3	Channel 3 status	Busy	Not Used	Idle
LED 4/CH4	Channel 4 status	Busy	Not Used	Idle
FAX	FAX status)	Busy	Not Used	Idle

☞ Switch SW400 must be set to Loop Start for FAX CO function to work.

4.3.5 Connectors

The COIB(4)-U( ) ETU has the following connectors:

- CN1 Connects to the backboard
- CN2 Future
- CN3 Future

4.3.6 Connections

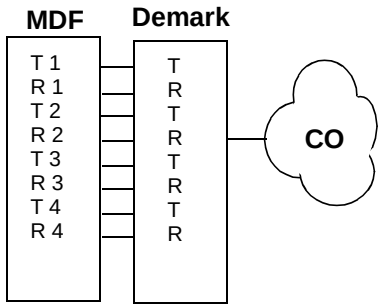


Figure 5-16 COIB(4)-U( ) ETU Connections

4.4 COIB(4)-U20/30 ETU

4.4.1 Description

This ETU can function the same as the COI(4)-U( ) or COID(4)-U( ) ETU to provide Central Office Interface. Only the COIB(4)-U30 ETU can support the CO Message Waiting Indication feature **(S9500)**. Transmit and receive pad controls have been added to the COIB(4)-U20 ETU. **Ground Start trunks are not supported.** When the ETU is set for COID mode, Loop Start trunks and Caller ID trunks are supported. Caller ID does not work in the COI mode. Fax CO Branch support is provided on the COIB(4)-U20 port 4 only.

This ETU contains circuitry for outside ring detection, holding, dialing, and control functions.

This ETU can provide a CAMA trunk for E911.

CAMA trunk support is provided on COIB(4)-U20 port 3.

When functioning as a COI(4)-U( ) or COID(4)-U( ) ETU only DTMF signaling is supported. Tip and Ring electrical fuses are provided to comply with UL 1459 requirements. Refer to Figure 5-17 COIB(4)-U20 ETU.

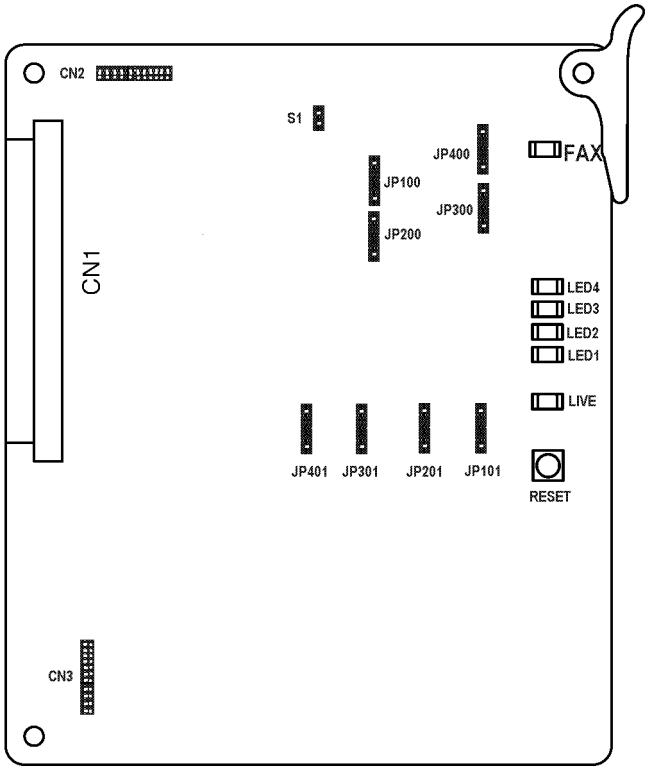


Figure 5-17 COIB(4)-U20 ETU

4.4.2 Installation

In COI mode, a maximum of four COIB(4)-U20 ETUs can be installed in slots S3~S6 in the Electra Elite 48 system limited by 16 trunks.

For Caller ID in COID mode, a maximum of two COIB(4)-U20 ETUs can be installed in slot S3 or S4 (**S7000 or lower**).

For **S8000 or higher** in COID mode, the COIB(4)-U20 ETU can be installed in slots S3~S6.

4.4.3 Switch Settings

Refer to Table 5-12 COIB(4)-U20 ETU Default Switch/ Jumper Settings.

Table 5-12 COIB(4)-U20 ETU Default Switch/Jumper Settings

Switch/ Jumper	Setting		Description
JP100~400	Jumpers 1-2 shorted Jumpers 2-3 shorted (default) Jumpers 3-4 shorted	6dB increase No Gain 6dB decrease	Receive pad for related channel.
JP101~401	Jumpers 1-2 shorted Jumpers 2-3 shorted (default) Jumpers 3-4 shorted	6dB increase No Gain 6dB decrease	Transmit pad for related channel.
S1	Open for COI Shorted (default) for COID		Selects the function for COIB(4)-U20 ETU between COI or COID mode
Reset	N/A		Resets the COIB(4)-U20 ETU

4.4.4 LED Indications

Table 5-13 COIB(4)-U20 ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED 1	Channel 1 status	Busy	Not Used	Idle
LED 2	Channel 2 status	Busy	Not Used	Idle
LED 3	Channel 3 status	Busy	Not Used	Idle
LED 4	Channel 4 status	Busy	Not Used	Idle
FAX	FAX status	Busy	Not Used	Idle

4.4.5 Connectors

The COIB(4)-U20 ETU has the following connectors:

- CN1 Connects to the backboard
- CN2 Future
- CN3 Future

4.4.6 Connections

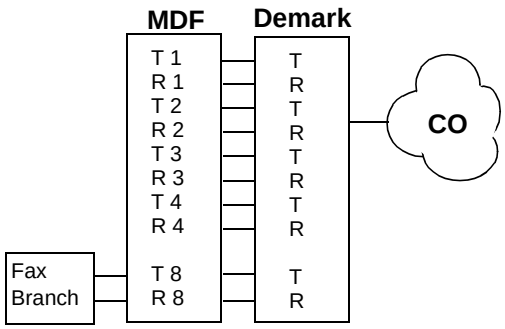


Figure 5-18 COIB(4)-U20 ETU Connections

4.4.7 ETU Feature Chart

ETU	**Caller ID** See ☞	**CO Message Waiting Indicate**	**Pad Control**	**Loop Start**	**Ground Start**	**Fax Branch**	**CAMA Trunk**
COI(4)-U10				X		X	X
COI(8)-U10				X	X		X
COID(4)-U10	X			X		X	X
COID(8)-U10	X			X			X
COIB(4)-U10	X			X	X	X	X
COIB(4)-U20	X		X	X		X	X
COIB(4)-U30	X	X	X	X		X	X
COIB(8)-U20	X		X	X			X
COIB(8)-U30	X	X	X	X			X

☞ Caller ID is not supported for Ground Start trunks.

☞ CAMA trunk support is provided on COIB(4)-U20 port 3. Other ETUs listed, except COIB(8)-U( ) ETU, support CAMA trunks on all ports.

4.5 COIB(8)-U20/30 ETU

4.5.1 Description

This ETU can function the same as the COI(8)-U( ) or COID(8)-U( ) ETU to provide Central Office Interface. Only the COIB(8)-U30 ETU can support the CO Message Waiting Indication feature **(S9500)**.Transmit and receive pad controls have been added to the COIB(8)-U( ) ETU. **Ground Start trunks are not supported.** When the ETU is set for COID mode, Loop Start trunks and Caller ID trunks are supported. Caller ID does not work in the COI mode.

This ETU contains circuitry for outside ring detection, holding, dialing, and control functions.

This ETU can provide a CAMA trunk for E911.

CAMA trunk support is provided on COIB(8)-U( ) ports 3 and 7 only.

When functioning as a COI(8)-U( ) or COID(8)-U( ) ETU only DTMF signaling is supported. Tip and Ring electrical fuses are provided to comply with UL 1459 requirements. Refer to Figure 5-19 COIB(8)-U( ) ETU.

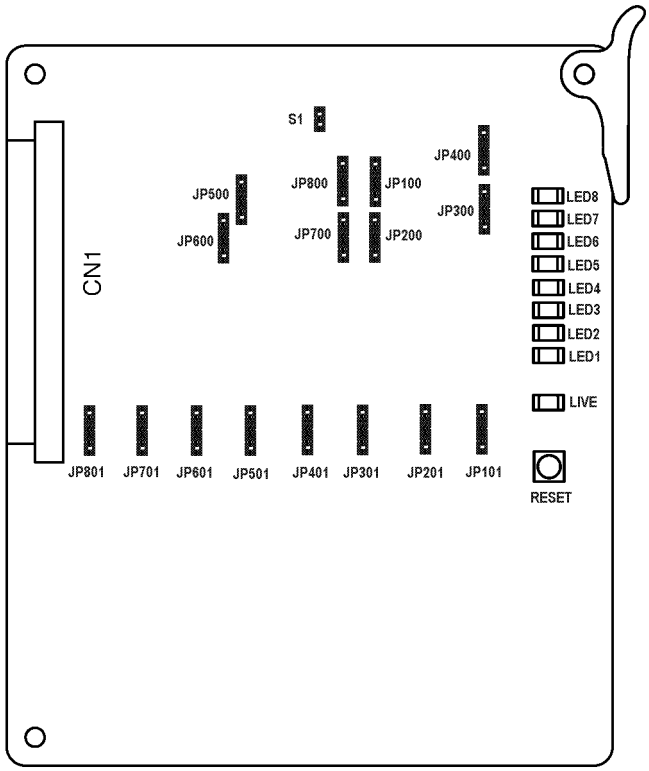


Figure 5-19 COIB(8)-U( ) ETU

4.5.2 Installation

In COI mode, a maximum of two COIB(8)-U( ) ETUs can be installed in slots S3~S6 in the Electra Elite 48 system limited by 16 trunks.

For Caller ID In COID mode, only one COIB(8)-U( ) ETU can be installed in slot S3 or S4 (**S7000 or lower**).

For **S8000 or higher** in COID mode, the COIB(8)-U( ) ETU can be installed in slots S3~S6 limited by 16 trunks.

4.5.3 Switch Settings

Refer to Table 5-14 COIB(8)-U( ) ETU Default Switch/ Jumper Settings.

Table 5-14 COIB(8)-U( ) ETU Default Switch/Jumper Settings

Switch/ Jumper	Setting		Description
JP100~ 800	Jumpers 1-2 shorted Jumpers 2-3 shorted (default) Jumpers 3-4 shorted	6dB increase No Gain 6dB decrease	Receive pad for related channel.
JP101~ 801	Jumpers 1-2 shorted Jumpers 2-3 shorted (default) Jumpers 3-4 shorted	6dB increase No Gain 6dB decrease	Transmit pad for related channel.
S1	Open for COI Shorted (default) for COID		Selects the function for COIB(8)-U( ) ETU between COI or COID mode
Reset	N/A		Resets the COIB(8)-U( ) ETU

4.5.4 LED Indications

Table 5-15 COIB(8)-U( ) ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED 1	Channel 1 status	Busy	Not Used	Idle
LED 2	Channel 2 status	Busy	Not Used	Idle
LED 3	Channel 3 status	Busy	Not Used	Idle
LED 4	Channel 4 status	Busy	Not Used	Idle
LED 5	Channel 5 status	Busy	Not Used	Idle
LED 6	Channel 6 status	Busy	Not Used	Idle
LED 7	Channel 7 status	Busy	Not Used	Idle
LED 8	Channel 8 status	Busy	Not Used	Idle

4.5.5 Connectors

The COIB(8)-U( ) has the following connector:

✆ CN1 Connects to the backboard

4.5.6 Connections

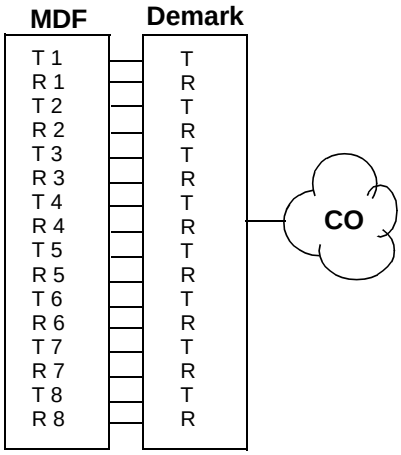


Figure 5-20 COIB(8)-U( ) ETU Connections

4.5.7 ETU Feature Chart

ETU	Caller ID See ☞	CO Message Waiting Indicate	Pad Control	Loop Start	Ground Start	Fax Branch	CAMA Trunk
COI(4)-U( )				X		X	X
COI(8)-U( )				X	X		X
COID(4)-U( )	X			X		X	X
COID(8)-U( )	X			X			X
COIB(4)-U( )	X			X	X	X	X
COIB(4)-U20	X		X	X		X	X
COIB(4)-U30	X	X	X	X		X	X
COIB(8)-U( )	X		X	X			X
COIB(8)-U30	X	X	X	X			X

☞ Caller ID is not supported for Ground Start trunks.

☞ CAMA trunk support is provided on COIB(8)-U( ) ports 3 and 7. Other ETUs listed, except COIB(4)-U20, support CAMA trunks on all ports.

4.6 COID(4)/(8)-U( ) ETU

4.6.1 Description

The COID(4)/(8)-U( ) ETU provides the Central Office interface for Caller ID Detection. This ETU provides circuitry for outside ring detection, hold, dialing, Caller ID detection, and control functions.

This ETU can provide a CAMA trunk for Enhanced E911.

The COID(4)/(8)-U( ) ETU provides four/eight trunks that are Loop Start with DTMF signaling only. Tip and Ring electrical fuses are provided to comply with UL 1459 requirements.

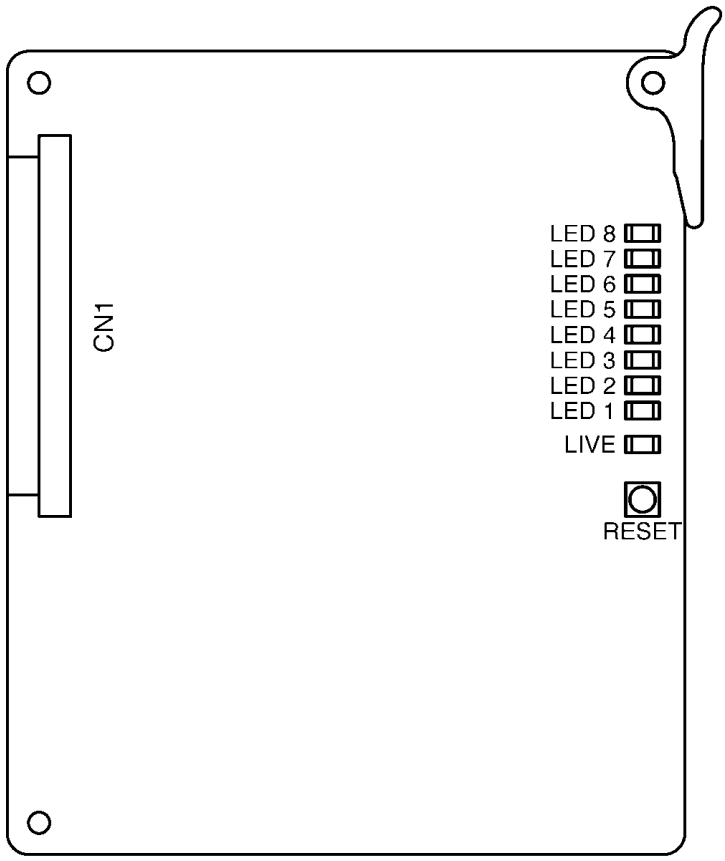


Figure 5-21 COID(8)-U( ) ETU

4.6.2 Installation

A maximum of two COID(4)/(8)-U( ) ETUs can be installed in the system in slot S3 or S4 (**S7000 or lower**).

For **S8000 or higher** four COIB(4)-U( ) ETUs or two COID(8)-U( ) ETUs can be installed in slots S3~S6 limited by 16 trunks.

4.6.3 Switch Settings

The **RESET** switch resets the unit.

4.6.4 LED Indications

Table 5-16 COID(4)/(8)-U( ) ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED 1	Line 1 status COID(4)/COID(8)	Busy	Not Used	Idle
LED 2	Line 2 status COID(4)/COID(8)	Busy	Not Used	Idle
LED 3	Line 3 status COID(4)/COID(8)	Busy	Not Used	Idle
LED 4	Line 4 status COID(4)/COID(8)	Busy	Not Used	Idle
LED 5	Line 5 status COID(8)	Busy	Not Used	Idle
LED 6	Line 6 status COID(8)	Busy	Not Used	Idle
LED 7	Line 7 status COID(8)	Busy	Not Used	Idle
LED 8	Line 8 status COID(8)	Busy	Not Used	Idle

4.6.5 Connectors

The COID(4)/(8)-U( ) has one connector:

- CN1 Connects to the backboard

4.6.6 Connections

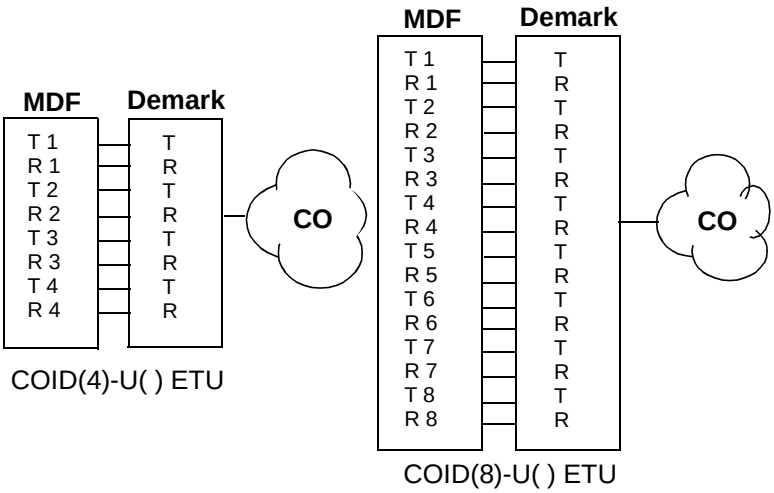


Figure 5-22 COID(4)/(8)-U( ) ETU Connections

4.7 DID(4)-U( ) ETU

4.7.1 Description

The DID(4)-( ) interfaces Direct Inward Termination lines and 2-way DID lines. This ETU provides a maximum of four DID lines. Wink start, delay start, immediate start, and second Dial Tone are accommodated with this ETU. Dial Pulse and DTMF are also supported. There are four built-in DTMF signal detectors. Tip and Ring electrical fuses are provided to comply with UL 1459 requirements.

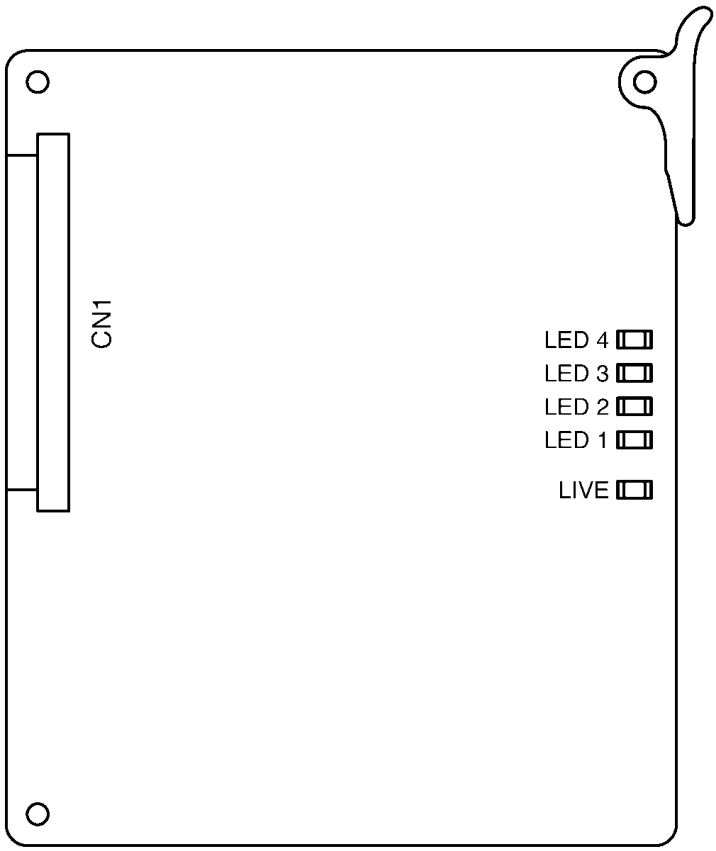


Figure 5-23 DID(4)-U( ) ETU

4.7.2 Installation

A maximum of four DID(4)-U( ) ETUs can be installed in the system in slots S3~S6.

4.7.3 LED Indications

Table 5-17 DID(4)-U( ) ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED 1	Line 1 status	Busy	Not Used	Idle
LED 2	Line 2 status	Busy	Not Used	Idle
LED 3	Line 3 status	Busy	Not Used	Idle
LED 4	Line 4 status	Busy	Not Used	Idle

4.7.4 Connectors

The DID(4)-U( ) ETU has one connector:

✆ CN1 Connects to the backboard

4.7.5 Connections

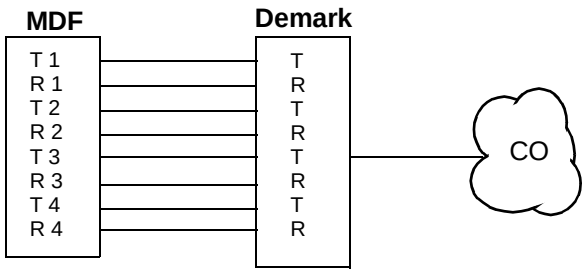


Figure 5-24 DID(4)-U( ) ETU Connections

4.8 DTI-U( ) ETU

4.8.1 Description

The DTI-U( ) ETU is a Digital Trunk Interface that provides termination of FT1 trunks (up to 16 DS-0 channels) that support K-CCIS and Automatic Number Indication (ANI) on T1.

A combination of Loop Start and Ground Start signaling can be used on the DTI-U( ) ETU. DTMF, Dial Pulse dialing, Tie line (E&M), and DID are supported. The DTI-U( ) ETU has 24 built-in DTMF detectors. Tip and Ring electrical fuses are provided to comply with UL 1459 requirements.

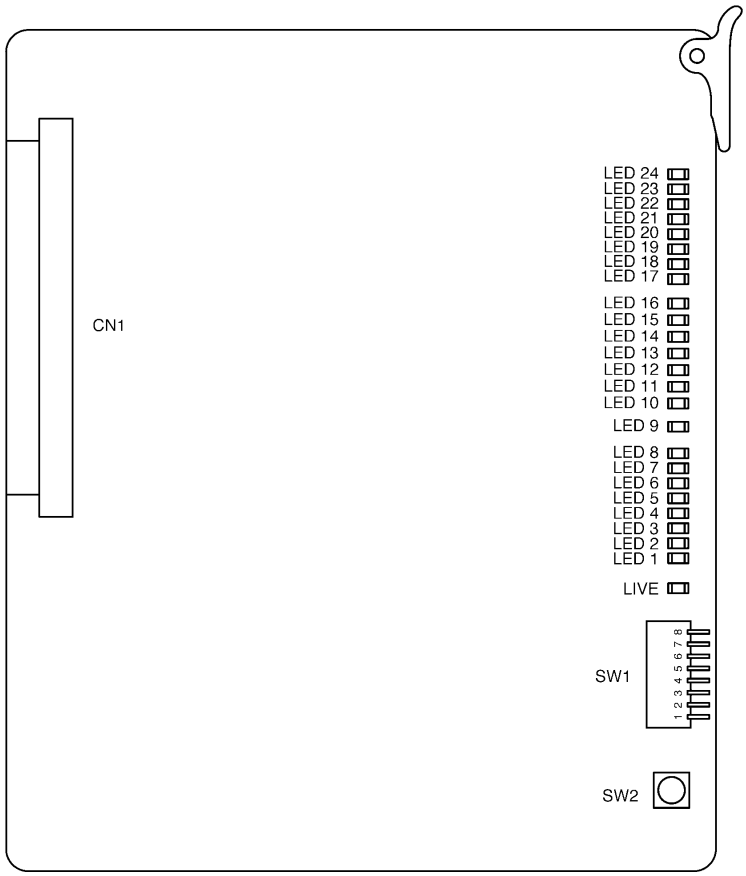


Figure 5-25 DTI-U( ) ETU

When channels are assigned to ANI, the DTI-U10 supports Feature Group D incoming only signaling using System Software S3000. The DTI-U20/30 supports Feature Group D incoming MF/outgoing DTMF signaling using System Software S4500 or higher.

Only the DTI-U30 can support the K-CCIS feature with point-to-point E&M Tie lines. System Software S7000 or higher is required.

4.8.2 Installation

When a DTI-U( ) ETU is installed, a CLKG-U( ) Unit must be installed on the MBD-U10 Unit.

One DTI-U( ) ETU can be installed in slot S4 (**S7000 or lower**).

For **S8000 or higher** four DTI-U( ) ETUs can be installed in slots S3~S6 limited by 16 trunks.

4.8.3 Switch Settings

Refer to Table 5-18 DTI-U( ) ETU Default Switch Settings.

Table 5-18 DTI-U( ) ETU Default Switch Settings

Switch	Setting	Description
SW1–1	On: Indicates alarm or loopback status of the channel Off: Indicates channel is busy or idle (**Default**)	Used to assign LED Indications
SW1–2	On: Loopback on Off: Loopback off (**Default**) Default: Off	Switches Loopback on and off
SW1–3	On: DTE Software Loopback in the DTI ETU) Off: Line Loopback to CO (**Default**)	Sets Loopback This switch is active only when SW1-2 is On.
SW1–4	On: Test Mode Off: Normal Operation (**Default**)	Switches between normal operation and test mode
SW1–5	N/A	N/A
SW1–6	N/A	N/A
SW2	N/A	Resets the DTI ETU

4.8.4 LED Indications

Table 5-19 DTI-U( ) ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED	**Channel Status**	**On Switch SW1-1 Off**	**On Switch SW1-1 On**	**Off**
LED 1	Channel 1	Busy	LSA Alarm	Idle
LED 2	Channel 2	Busy	AIS Alarm	Idle
LED 3	Channel 3	Busy	OOF Alarm	Idle
LED 4	Channel 4	Busy	RAI Alarm	Idle
LED 5	Channel 5	Busy	CRC Alarm	Idle
LED 6	Channel 6	Busy	BPV Alarm	Idle
LED 7	Channel 7	Busy	SLIP Alarm	Idle
LED 8	Channel 8	Busy	N/A	Idle
LED 9	Channel 9	Busy	TSC Alarm	Idle
LED 10	Channel 10	Busy	ESA Alarm	Idle
LED 11	Channel 11	Busy	LOS Alarm	Idle
LED 12	Channel 12	Busy	N/A	Idle
LED 13	Channel 13	Busy	N/A	Idle
LED 14	Channel 14	Busy	N/A	Idle
LED 15	Channel 15	Busy	N/A	Idle
LED 16	Channel 16	Busy	N/A	Idle
LED 17	Not Used	Not Used	Line Loopback On	Not Used
LED 18	Not Used	Not Used	DTE Loopback On	Not Used
LED 19	Not Used	Not Used	N/A	Not Used
LED 20	Not Used	Not Used	N/A	Not Used
LED 21	Not Used	Not Used	N/A	Not Used
LED 22	Not Used	Not Used	N/A	Not Used
LED 23	Not Used	Not Used	N/A	Not Used
LED 24	Not Used	Not Used	N/A	Not Used

4.8.5 Alarm Conditions

A brief description of each alarm condition is given below.

- Alarm Indication Signal (AIS) Detection

  On red when the system is receiving an Alarm Indication Signal from an FT1 trunk.

- Controlled Slip Event Detection (SLIP)

  On red when the timing difference between a synchronous receiving terminal and the received signal exceeds the buffering ability of the terminal.

- Cyclic Redundancy Check (CRC) Error Event Detection

  On red when a CRC Error occurs.

- Excessive Bipolar Violation (BPV) Detection

  On red when excessive BPV is detected.

- Line Synchronization Alarm (LSA) Detection

  On red when an FT1 trunk loses frame synchronization.

- Out-of-Frame (OOF) Condition Detection

  On red when two of the four or five framing data bits received are in error.

- Remote Alarm Indication (RAI) Detection

  On red when RAI is received.

4.8.6 Connectors

The DTI-U( ) ETU has one connector:

- CN1 Connects to the backboard

4.8.7 Connections

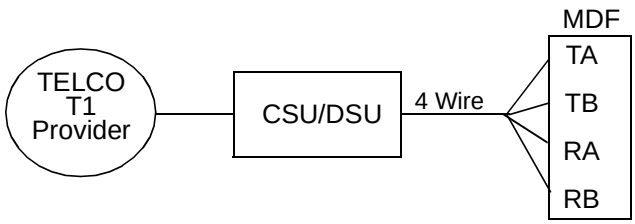


Figure 5-26 DTI-U( ) ETU Connector

4.9 IPT(4)/(8)-U( ) ETU

4.9.1 Description

The IP Gateway IPT(4)/(8)-U( ) ETU is an optional interface for the Electra Elite KSU that can combine various trunk and Tie line calls into Gateway trunks. This ETU can be assigned as a 2-port TLI(2)-U( ), 4-port DID(4)-U( )/COI(4)-U( )/COID(4)-U( ) ETU, or 8-port COI(8)/COID(8)-U( ) ETU.

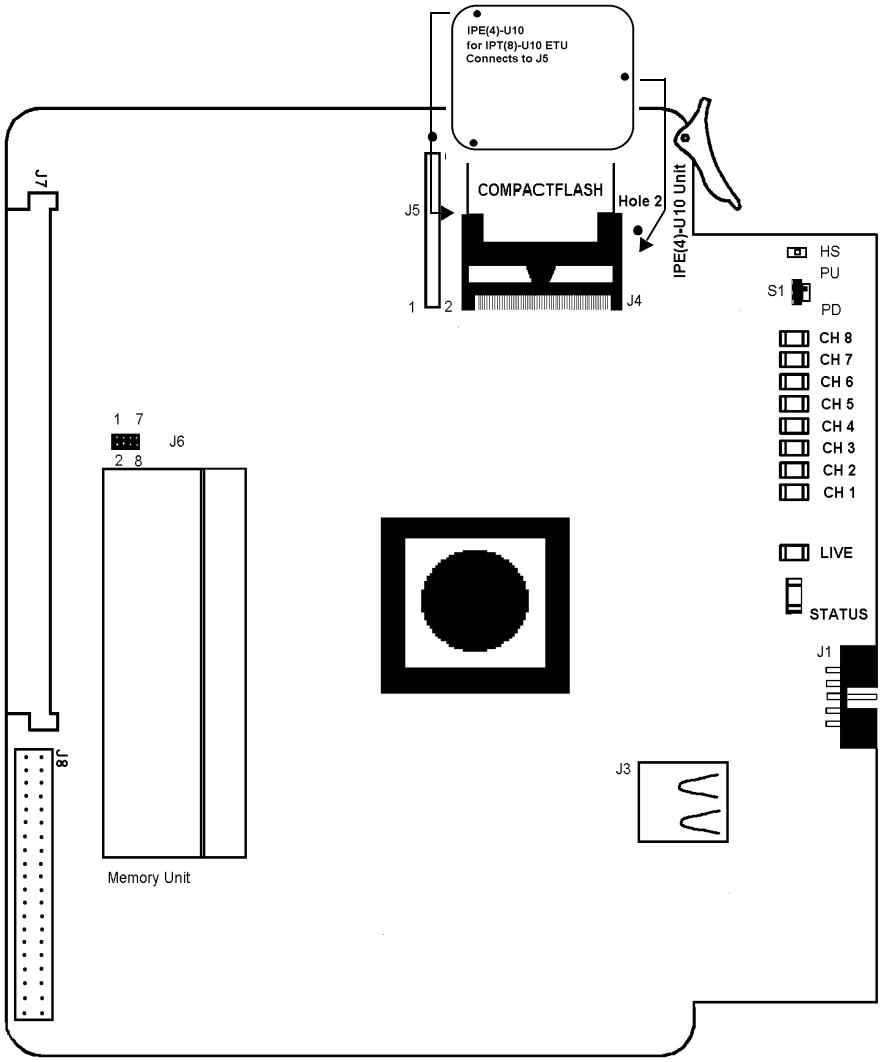


Figure 5-27 IPT(8)-U( ) ETU

The Voice over IP trunk ETU provides the following options:

Table 5-20 VoIP Options

#	Configuration	Number of Ports IPT(4)	IPT(8)	Installation Slot Elite 48	Elite 192
1	COI	4	8	S2~S7	S1~S8
2	COID	4	8	S3 or S4	S1~S4
3	DID	4	4	S2~S7	S1~S8
4	TLI	2	2	S2~S7	S1~S8

4.9.2 Installation

The Gateway ETU can be installed in KSU slots that support the applicable ETU simulated.

The IPT(4)-U( ) ETU is converted to IPT(8)-U( ) ETU by installing daughter board IPE(4)-U( ) Unit.

Refer to Elite IP Gateway Card Installation Manual.

4.9.3 LED Indications

✆ HS

When Switch S1 is placed to PD, this LED lights red. The IPT(4)-U( ) ETU starts the shutdown. When shutdown is complete the LED goes off along with others to indicate that the ETU can be removed from the KSU.

✆ CH8~1

Indicates the status of associated channel or trunk as in COID/DID as follows:

Trunk Status	COID LED	DID LED
Not Installed or Idle	Off	Off
Incoming	Off	On
Busy	On	On

✆ Live

Flashes red when ETU is receiving power from the KSU.

- Ethernet Status

  Two built-in LEDs (one green and one yellow) on the RJ-45 indicate Ethernet connection status. The yellow LED is On when the Ethernet link is up. The green LED flashes to indicate activity.

- Status

  This 2-color (red and green) LED shows status of all Gateway trunks. The location of a detected error is indicated by the following table:

Trunk Status	LED Condition	Error Location
Power On	Off	BIOS, Hardware
Start DSP download	Red	DSP Driver
DSP download OK	Red and Green	DSP Download
Successful Application Start	Green	Application Load

4.9.4 IPT(4)-U( ) to IPT(8)-U( ) ETU Conversion

The IPE(4)-U( ) Unit is attached to the IPT(4)-U( ) ETU to convert it to the IPT(8)-U( ) ETU. This unit comes with two attached standoffs with an extra screw in the bottom.

1. Remove the screw from the bottom of each standoff.

2. Line up the IPE(4)-U( ) Unit standoffs with Holes 1 and 2 and connector J1 with IPT(4)-( ) ETU connector J5, and press down until the IPE(4)-U( ) Unit is firmly attached to the IPT(4)-U( ) ETU.

3. Install the two previously removed screws through holes 1 and 2 to Connect the standoffs to the IPT(4)-U( ) ETU.

4.9.5 Connectors

The IPT(4)/(8)-U( ) ETU has two connectors:

- CN1 Connects to the backboard
- RJ-45 Connects to the Ethernet

4.9.6 Switch S1

Switch S1 must be in PD (power down) for ETU installation, and placed in PU (power up) to activate the ETU. After the ETU is activated, S1 is placed in PD to power down the ETU for removal.

4.9.7 Connections

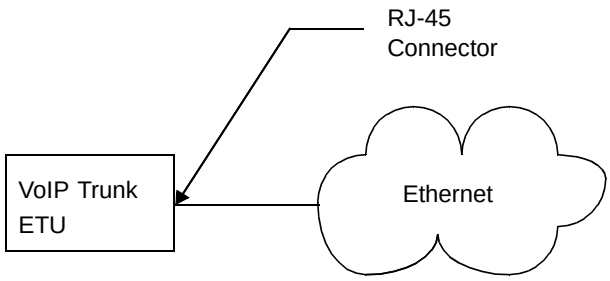


Figure 5-28 IPT(4)/(8)-U( ) ETU Connections

4.10 PRT(1)-U( ) ETU

4.10.1 Description

The PRT(1)-U( ) ETU is a Digital Trunk Interface that provides for the termination of an ISDN-PRI line for voice service only.

The PRT(1)-U( ) ETU supports AT&T 4ESS (Custom), AT&T 5ESS (Lucent), DMS-100 (Custom or National ISDN) and NI-2 protocols. Call-by-Call and Universal call handling are also supported. Tip and Ring electrical fuses are provided to comply with UL 1459 requirements.

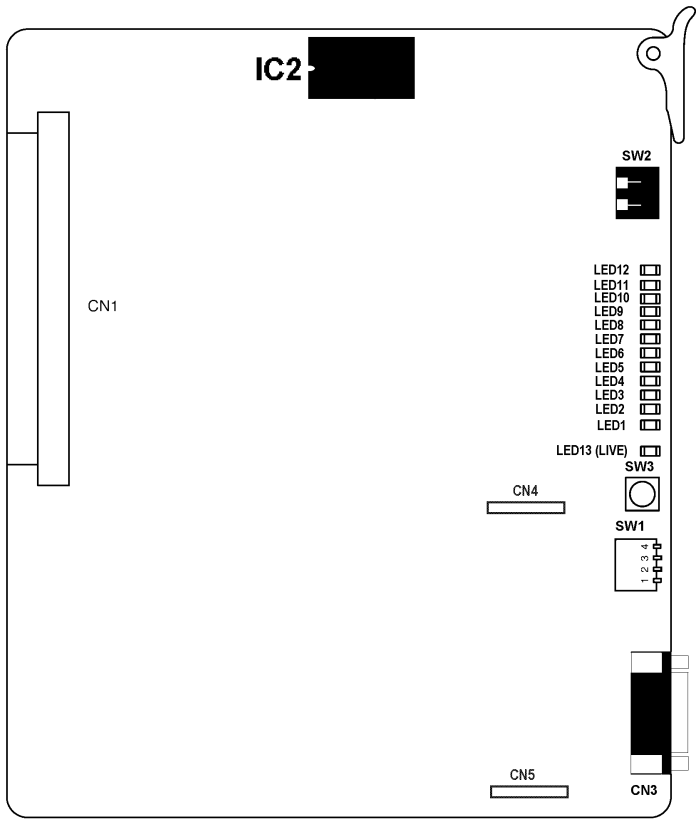


Figure 5-29 PRT(1)-U( ) ETU

4.10.2 Installation

When a PRT(1)-U( ) ETU is installed, a CLKG-U( ) Unit must be installed on the MBD-U10 Unit. One PRT(1)-U( ) ETU can be installed only in slot S4 (**S7000 or lower**).

For **S8000 or higher** four PRT(1)-U( ) ETUs can be installed in slots S3~S6 limited by 16 trunks.

4.10.3 Switch Settings

Switch SW1 is a 4-position DIP switch used to assign the application. Table 5-21 PRT(1)-U( ) ETU SW1 Settings shows application selection. **SW1-4 is not used and must be OFF**.

Table 5-21 PRT(1)-U( ) ETU SW1 Settings

SW1–1	SW1–2	SW1–3	SW1–4	Application
ON	ON	ON	OFF	NI-2
OFF	ON	ON	OFF	4ESS (AT&T Custom)
OFF	OFF	ON	OFF	AT&T 5ESS (Lucent Custom)
ON	ON	OFF	OFF	DMS-100 (Custom) *
ON	OFF	ON	OFF	DMS-100 (National ISDN) **

* Nortel Specification NIS-A211-1

** Nortel Specification NIS-A233-1

Switch SW2 is an 8-position rotary switch that can be set even during operation. A small flat screwdriver can be used to set positions as follows:

Position 0	Alarm Indications
Position 1	B Channels 01~12 Status Indication using LEDs 1~12
Position 2	B Channels 13~23 Status Indication using LEDs 1~12
Positions 3	CO Trunks 01~12 assigned to PRT ETU Status Indication using LEDs 1~12
Positions 4	CO Trunks 13~23 assigned to PRT ETU Status Indication using LEDs 1~12
Positions 5 & 6	Not Used
Position 7	Inspection Mode in production line

4.10.4 LED Indications

Table 5-22 PRT(1)-U( ) ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Stopped (Power On)	Normal Operation	No Power

LED	Channel/Trunk Status	On (Alarms) SW2 Position 0	On SW2 Position 1	On SW2 Position 3
LED 1	Channel 1	Layer 1 Active	Channel Busy	CO Trunk 1 Busy
LED 2	Channel 2	SLIP	Channel Busy	CO Trunk 2 Busy
LED 3	Channel 3	RAI	Channel Busy	CO Trunk 3 Busy
LED 4	Channel 4	LOF	Channel Busy	CO Trunk 4 Busy
LED 5	Channel 5	AIS	Channel Busy	CO Trunk 5 Busy
LED 6	Channel 6	CRC Error	Channel Busy	CO Trunk 6 Busy
LED 7	Channel 7	Active Call	Channel Busy	CO Trunk 7 Busy
LED 8	Channel 8	Not Used	Channel Busy	CO Trunk 8 Busy
LED 9	Channel 9	Not Used	Channel Busy	CO Trunk 9 Busy
LED 10	Channel 10	Not Used	Channel Busy	CO Trunk 10 Busy
LED 11	Channel 11	Not Used	Channel Busy	CO Trunk 11 Busy
LED 12	Channel 12	Not Used	Channel Busy	CO Trunk 12 Busy
LED	**Channel/Trunk Status**	**N/A**	**On SW2 Position 2**	**On SW2 Position 4**
LED 1	Channel 13	N/A	Channel Busy	CO Trunk 13 Busy
LED 2	Channel 14	N/A	Channel Busy	CO Trunk 14 Busy
LED 3	Channel 15	N/A	Channel Busy	CO Trunk 15 Busy
LED 4	Channel 16	N/A	Channel Busy	CO Trunk 16 Busy
LED 5	Channel 17	N/A	Channel Busy	CO Trunk 17 Busy
LED 6	Channel 18	N/A	Channel Busy	CO Trunk 18 Busy
LED 7	Channel 19	N/A	Channel Busy	CO Trunk 19 Busy
LED 8	Channel 20	N/A	Channel Busy	CO Trunk 20 Busy
LED 9	Channel 21	N/A	Channel Busy	CO Trunk 21 Busy
LED 10	Channel 22	N/A	Channel Busy	CO Trunk 22 Busy
LED 11	Channel 23	N/A	Channel Busy	CO Trunk 23 Busy
LED 12	Not Used	N/A	Not Used	Not Used

4.10.5 Alarm Conditions

A brief description of each alarm condition referred to under the SW2, position 0 alarm Indications is given below.

- Layer 1 Status

  LED is on red when layer 1 is active. The LED is off when layer 1 is inactive.

- Controlled Slip indication (SLIP)

  When the difference between the timing of a synchronous receiving terminal and the received signal exceeds the buffering ability of the synchronous terminal, the LED is on red.

- Remote Alarm Indication (RAI) Detection

  When RAI is received, the LED is on red.

- Loss of Frame (LOF) Condition Detection

  When two of the four or five framing data bits received are in error, the LED is on red.

- Alarm Indication Signal (AIS) Detection

  When the system is receiving an Alarm Indication Signal from a PRT trunk, the LED is on red.

- Cyclic Redundancy Check (CRC) Error Event Detection

  When a CRC Error occurs, the LED is on red.

- Active Call

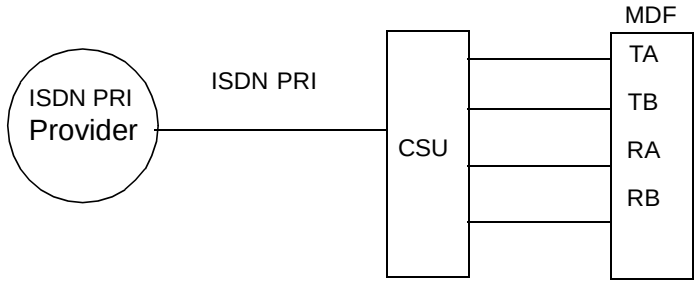
  LED is on red to indicate an active call.

4.10.6 Connectors

The PRT(1)-U( ) ETU has two connectors:

- CN1 Connects to the backboard
- CN3 9-pin RS-232C connector used for maintenance

4.10.7 Connections



The CSU may not always be required

Figure 5-30 PRT(1)-U( ) ETU Connector

4.11 TLI(2)-U( ) ETU

4.11.1 Description

The TLI(2)-U( ) ETU provides for the termination and operation of a maximum of two E&M Tie lines (4-wire, Type I, or Type V, 10 pps or 20 pps, Dial Pulse, or DTMF). Immediate Start, Delay Start, Wink Start, and Second Dial Tone signaling are also provided. The TLI(2)-U( ) ETU has two built-in DTMF signal detectors.

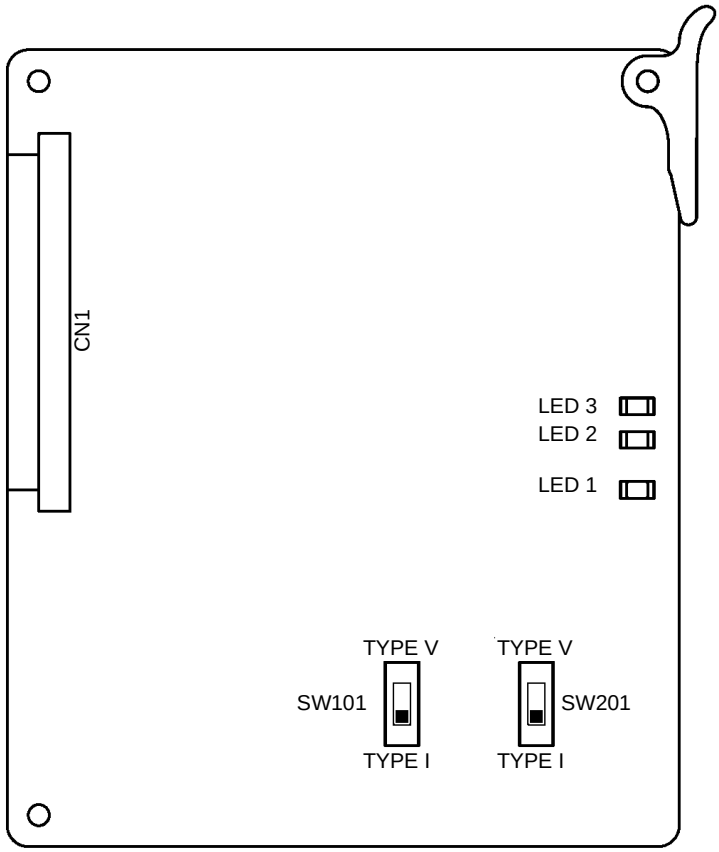


Figure 5-31 TLI(2)-U( ) ETU

4.11.2 Installation

A maximum of four TLI(2)-U( ) ETUs can be installed in slots S3~S6.

4.11.3 Switch Settings

Refer to Table 5-23 TLI(2)-U( ) ETU Default Switch Settings.

Table 5-23 TLI(2)-U( ) ETU Default Switch Settings

Switch	Setting	Description
SW101	When lines provided by this ETU are used for back-to-back connections, set to Type V. When connection is to a Central Office, set to Type I. Default: Type V	Switch Type I or Type V for Line 1
SW201	When lines provided by this ETU are used for back-to-back connections, set to Type V. When connection is to a Central Office, set to Type I. Default: Type V	Switch Type I or Type V for Line 2

4.11.4 LED Indications

Table 5-24 TLI(2)-U( ) ETU LED Indications

LED	Description	On	Flashing	Off
LED 1	ETU status	Operation stopped (Power On)	Normal Operation	No Power
LED 2	Line 1 status	Busy	Not Used	Idle
LED 3	Line 2 status	Busy	Not Used	Idle

4.11.5 Connectors

The TLI(2)-U( ) ETU has one connector:

- CN1 Connects to the backboard

4.11.6 Connections

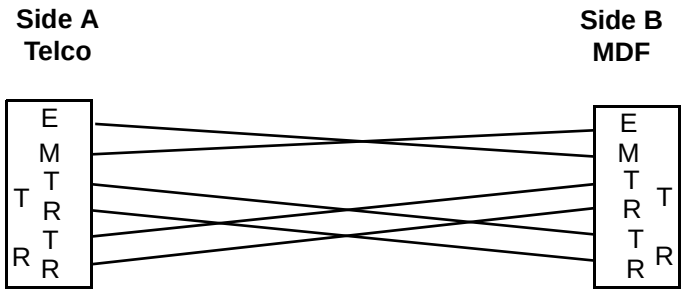


Figure 5-32 TLI(2)-U( ) ETU Connections

SECTION 5
STATION ETUS

5.1 CNF(8)-U( ) ETU

5.1.1 Description

The Multiline Conference Bridge allows any intercom user and any outside party calling to a port of the CNF(8)-U( ) ETU to make a multiparty conference call. One 8-party conference or two 4-party conferences are supported and regulated by a switch setting.

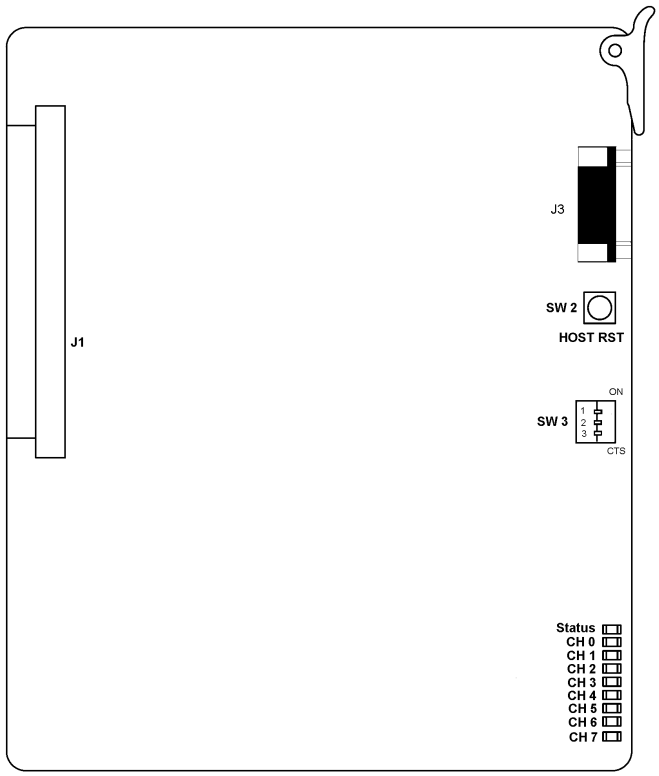


Figure 5-33 CNF(8)-U( ) ETU

5.1.2 Installation

Only two CNF(8)-U( ) ETUs can be installed in slots S2~S7 in the B48-U10 KSU. Installed as SLI(8) in Memory Block 7-1 (Card Interface Slot Assignment).

5.1.3 Switch Settings

Table 5-25 CNF(8)-U( ) ETU Reset Switch

Switch	Setting	Description
SW2	Press to Reset	Host Reset Switch

Table 5-26 CNF(8)-U( ) ETU Maximum Conference Time Switch

Switch	Setting		Maximum Conference Time
	SW3-2	SW3-3	
CTS	ON	ON	1 Hour
	ON	OFF	2 Hour
	OFF	ON	3 Hour
	OFF	OFF	No Limit

Table 5-27 CNF(8)-U( ) ETU Party Size Switch

Switch	Setting	Description
SW3-1	ON	1 8-Party Conference
SW3-1	OFF	2 4-Party Conferences

5.1.4 LED Indications

Table 5-28 CNF(8)-U() ETU LED Indications

LED	Description	On	Flashing	Off
STATUS	ETU status	Operation stopped (Power On)	Normal Operation	No Power
CH 0	Status	Busy	Not Used	Idle
CH 1	Status	Busy	Not Used	Idle
CH 2	Status	Busy	Not Used	Idle
CH 3	Status	Busy	Not Used	Idle
CH 4	Status	Busy	Not Used	Idle
CH 5	Status	Busy	Not Used	Idle
CH 6	Status	Busy	Not Used	Idle
CH 7	Status	Busy	Not Used	Idle

5.1.5 Connectors

The CNF(8)-U( ) ETU has three connectors:

- J1 Connects to the backboard
- J2 Not currently used
- J3 9-pin RS-232C connector for maintenance

5.2 DPH(4)-U( ) ETU

5.2.1 Description

The DPH(4)-U( ) ETU provides connection for four Doorphones (DP-D-1A), and also provides the associated four Door Lock Release relays.

Doorphones and relays are paired together. The station user talking into a doorphone, controls only the Door Lock Release relay for that doorphone when the feature code is dialed.

The DPH(4)-U( ) has two audio paths to be shared by four doorphones. Two simultaneous doorphone calls are allowed. Doorphones 1/3 and 2/4 are paired together.

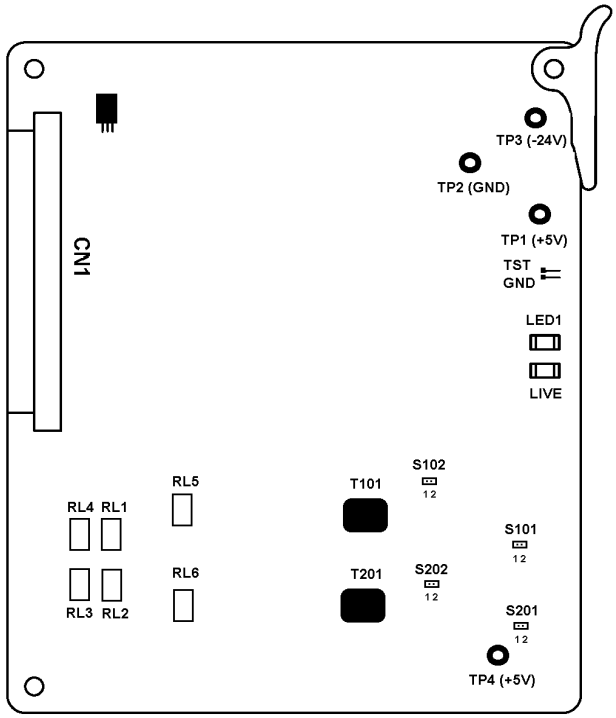


Figure 5-34 DPH(4)-U( ) ETU

5.2.2 Installation

Only one DPH(4)-U( ) ETU can be installed in the system in slots S3~S6.

The DP-D-1A Doorphone that is connected to the ETU has the following dimensions:

- Height: 5.125 in. 130.18 mm
- Width: 3.875 in. 98.43 mm
- Depth: 1.00 in. 25.4 mm

5.2.3 Switch Settings

Refer to Table 5-29 DPH(4)-U( ) ETU Default Jumper Settings.

Table 5-29 DPH(4)-U( ) ETU Default Jumper Settings

Jumper	Setting	Description
S101	Shorted	Remove short bar to increase DP1 and DP3 volume by 6 dB.
S201	Shorted	Remove short bar to increase DP2 and DP4 volume by 6 dB.
S102	Shorted	Remove short bar to increase DP1 and DP3 transmit volume by 6 dB.
S202	Shorted	Remove short bar to increase DP2 and DP4 transmit volume by 6 dB.

5.2.4 LED Indications

Live LED indications are listed below.

- Blinking Red Normal Operation
- Steady Red Operation Stopped (power on)
- Off No Power

LED 1 indication are listed below.

- Steady Red A Circuit Is Busy
- Off All Circuits Are Idle

5.2.5 Connectors

The DPH(4)-U( ) ETU has the following connectors:

- CN1 — Connects to the Backboard
- Relay — Connections provided at the MDF
- Doorphone — Connections provided at the MDF

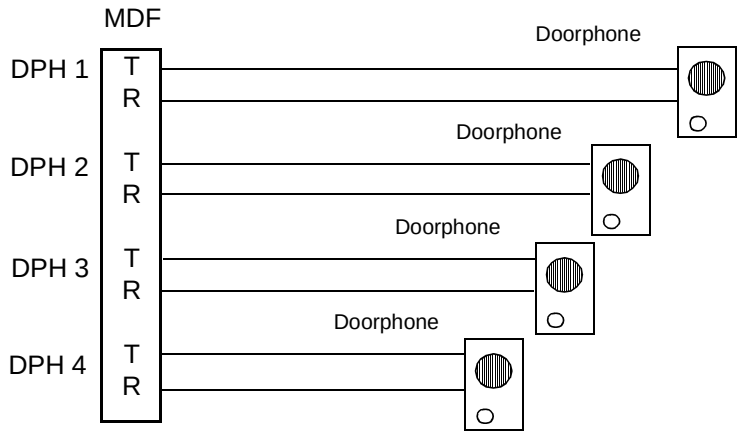


Figure 5-35 DPH(4)-U( ) ETU Doorphone Connector

5.2.6 Specifications

- Relay contacts are 24 Vdc at 500 mA

5.3 ESI(8)-U( ) ETU

5.3.1 Description

The Electronic Station Interface ETU provides an 8-port interface for Multiline Terminals, Electra Mail CTI, Attendant Consoles, Single Line Telephone Adapter SLT(1)-U( ) ADP, and DBM(B)-U( ) Box.

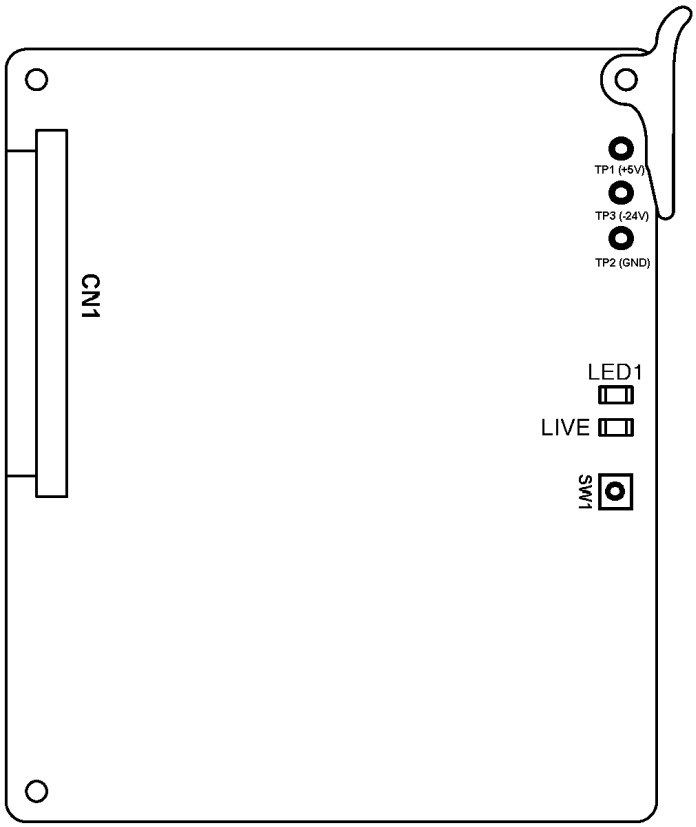


Figure 5-36 ESI(8)-U( ) ETU

5.3.2 Switch Settings

SW1 resets the ETU.

5.3.3 Installation

The first ESI(8)-U( ) ETU is built-in on the MBD-U10 Unit and designated as Slot 1 for ports 01~08. A maximum of three additional ESI(8)-U( ) ETUs can be installed in the system in slots S3~S6.

5.3.4 LED Indications

Live LED indications are listed below.

- Blinking Red Normal Operation
- Steady Red Operation Stopped (power on)
- Off No Power

LED1 indications are listed below.

- Steady Red Some port(s) busy
- Off All ports idle

5.3.5 Connectors

The ESI(8)-U( ) ETU has one connector:

- CN1 Connects to the backboard

5.3.6 Connections

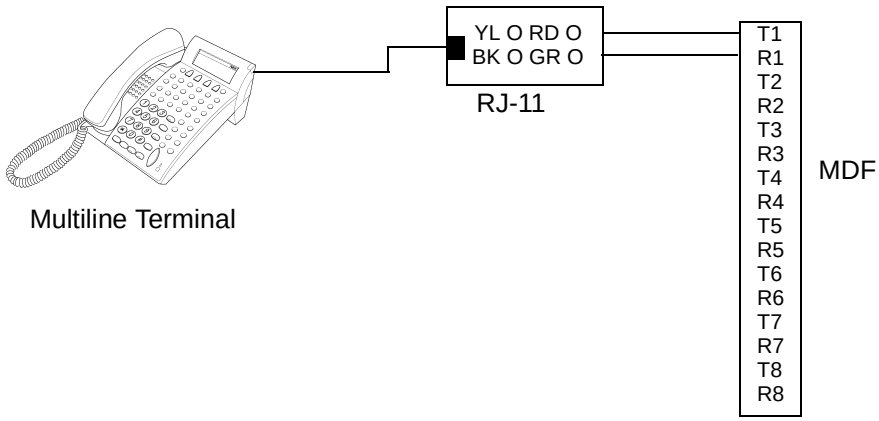


Figure 5-37 ESI(8)-U( ) ETU Connection

5.4 OPX(2)-U ( ) ETU

5.4.1 Description

The OPX(2)-U( ) ETU provides an interface for two off-premise extensions. This ETU has a built-in ringing generator (RSG). A maximum of 1600Ω of loop resistance (including about 200Ω for the Single Line Telephone) is acceptable between the OPX(2)-U( ) ETU and a Single Line Telephone.

This ETU also provides circuitry for loop status detection, talk battery, sending ringing signals from the RSG unit to the Single Line Telephones, and dial pulse detection.

☞ The PBR circuit in the MBD-U10 Unit or the PBR( )-U( ) ETU is required with Single Line Telephone Connection.

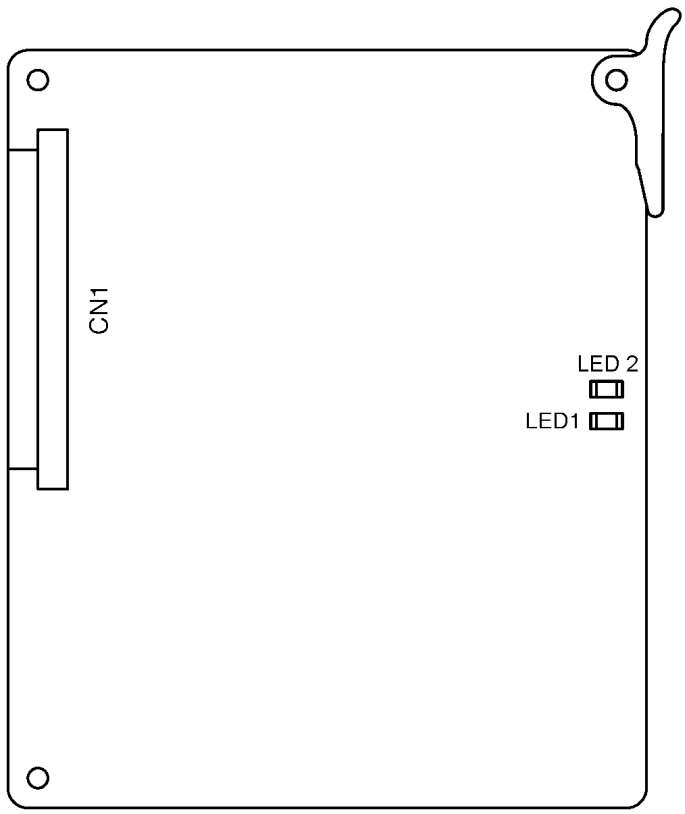


Figure 5-38 OPX(2)-U( )Unit

5.4.2 Installation

A maximum of three OPX(2)-U( ) ETUs can be installed in slots S3~S6. The extension can be run up to three miles (5 km) using 24 AWG wiring.

5.4.3 LED Indications

LED 1 indications are listed below.

- ✆ Blinking Red Normal Operation
- ✆ Steady Red Operation Stopped (power on)
- ✆ Off No Power

LED 2 indications are listed below.

- ✆ Steady Red Some port(s) busy
- ✆ Off All ports idle

5.4.4 Connectors

The OPX(2)-U( ) ETU has one connector:

- ✆ CN1 Connects to the backboard

5.4.5 Connections

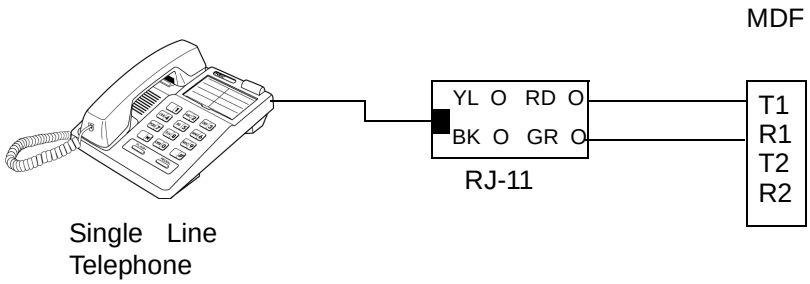


Figure 5-39 OPX(2)-U( ) ETU CN1 Connection

5.5 SLI(4)/(8)-U( ) ETU

5.5.1 Description

The SLI(4)/(8)-U( ) ETU.has a built-in ringing generator (RSG) and provides an interface for Single Line Telephones or analog Voice Mail ports.

This ETU also provides circuitry for loop status detection, talk battery, sending ringing signals, message waiting, and loop disconnect for dial pulse signal detection.

☞ The PBR circuit on the MBD-U10 Unit or the PBR( )-U( ) ETU is required with Voice Mail or DTMF Single Line Telephones.

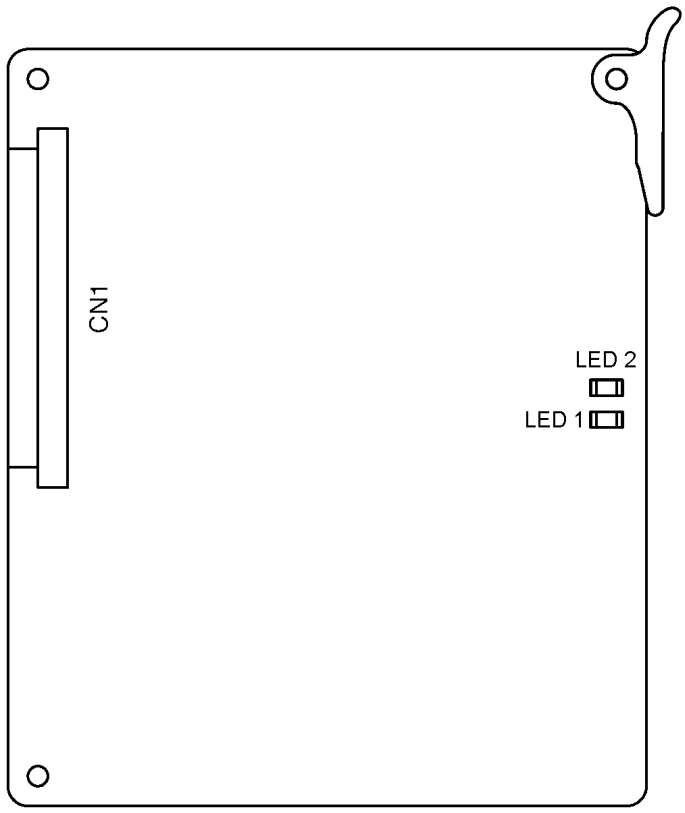


Figure 5-40 SLI(8)-U( ) ETU

5.5.2 Installation

A maximum of four SLI(4)-U( ) or three SLI(8)-U( ) ETUs can be installed in slots S3~S6.

5.5.3 LED Indications

LED 1 indications are listed below.

- Blinking Red — Normal Operation
- Steady Red — Operation Stopped (power on)
- Off — No Power

LED 2 indications are listed below.

- Steady Red — Some port(s) busy
- Off — All ports idle

5.5.4 Connectors

The SLI(4)/(8)-U( ) ETU has one connector:

- CN1 — Connects to the backboard

5.5.5 Connections

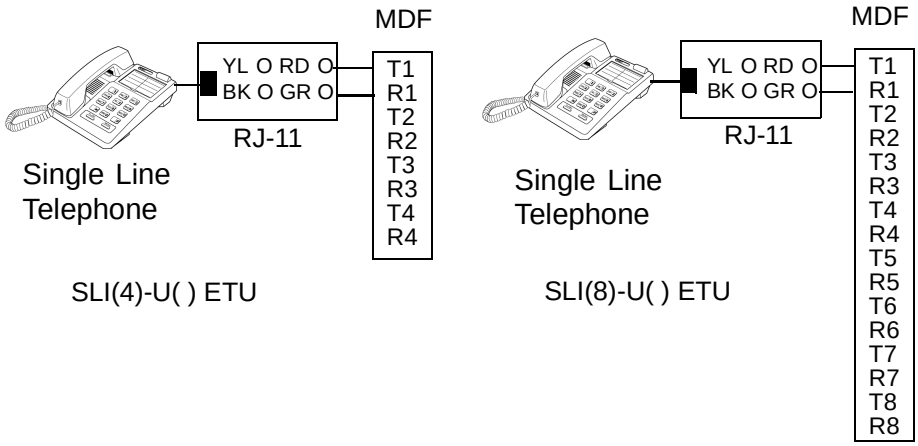


Figure 5-41 SLI(4)/(8)-U( ) ETU Connections

5.6 VDH2(8)-U( ) ETU

5.6.1 Description

The VDH2(8)-U( ) ETU integrates both LAN and station cabling. This is a standard ESI ETU with additional circuitry for the LAN integration function.

Key Telephones are connected to the VDH2(8)-U( ) ETU using a VDD-U Unit.

Each VDH2(8)-U( ) ETU has a built-in HUB facility with eight ports (IEEE 802.3 10Base-T).

A VDD-U( ) adapter is required at each digital station or Attendant Console. Refer to 3.11.1 Installing a VDD-U Unit on a Multiline Terminal in Chapter 7 on page 7-38.

5.6.2 Specifications

Refer to Table 5-30 VDH2(8)-U( ) ETU Specifications.

Table 5-30 VDH2(8)-U( ) ETU Specifications

Description	Specifications
General Specifications	
Access Method	CSMA/CD Method (IEEE 802.3)
Transmission Speed	10 Mbps
Transmission Interface	10Base-2: 1 port 10Base-T + *D*^{term} Interface: 8 ports
Transmission Interface Connectors	
10Base-2	BNC (coaxial cable)
10Base-T + Dterm Interface	RJ-45 (modular for 10Base-T)
Transmission Cable Type and Maximum Cable Length	
10Base-2	Coaxial Cable – 606.8 feet (185 meters)
10Base-T + *D*^{term} Interface	Twisted Pair Cable (LAN Category 3 or higher) – 328 feet (100 meters) for 10Base-T technology.

5.6.3 Cabling

The information listed below applies when connecting the VDH2(8)-U( ) ETU.

- Normally the 10Base-T cables connected to the VDH2(8)-U( ) ETUs cannot be directly connected to another HUB or to a LAN terminal. Jumpers are provided for the VDH2(8)-U( ) to turn off the station abilities for ports 1~7. In this case, LAN terminals can be connected directly to the VDH2(8)-U( ) ETU. Refer to Figure 5-42 VDH2(8)-U( ) ETU Jumpers for the layout of jumpers on the KTU.

- Port 8 is unique because the station abilities cannot be separated by changing a jumper like ports 1~7. Port 8 is used for cascading HUBs. Connect Port 8 either to another VDH2(8)-U( ) (Port 1~7) or an external HUB. For this case, be sure to set SW2 on the VDH2(8)-U( ) to =. If SW2 is set to X, then Port 8 is used as a regular coreline connection. Refer to Figure 5-43 10Base-T Cable Connections.

- The VDH2(8)-U( ) ETU can be used with 10Base-2 and 10Base-T cables. VDH2(8)-U( ) ETU HUBs can be cascaded using 10Base2 cables. The 10Base2 connector can also be used to connect the VDH2(8)-U( ) ETU to a LAN backbone. (Refer to Figure 5-44 VDH2(8)-U( ) ETU.) In these cases the 8 port is still used for coreline. The 10Base2 cable interconnecting VDH2(8)-U10 ETUs must be greater than 0.5 meters. The 10Base2 cables should be neatly coiled. When the 10Base2 cables are connected to the VDH2(8)-U( ) BNC connector, a terminating plug must be used for the last device on the cable. Refer to Figure 5-45 VDH2(8)-U( ) ETU Connectors.

- Using the 10Base-2 cables is the preferred method of cascading VDH2(8)-U( ) ETU hubs because it does not reduce the quantity of station ports that the ETU can provide.

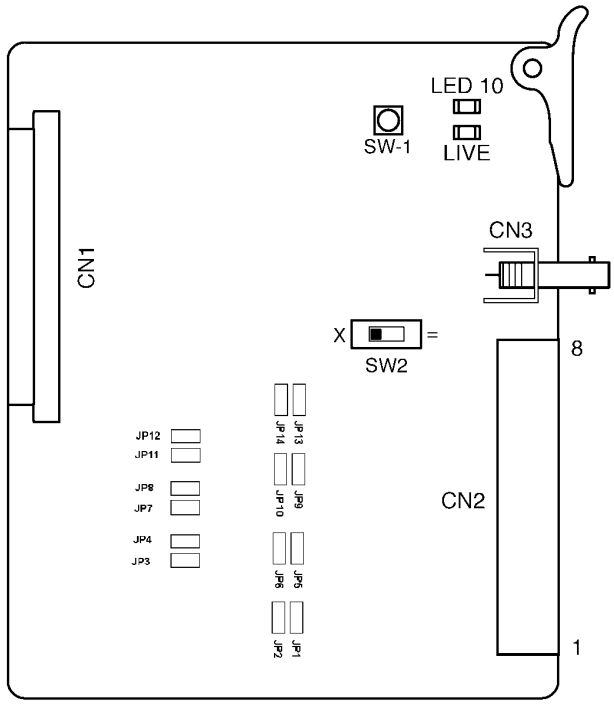


Figure 5-42 VDH2(8)-U( ) ETU Jumpers

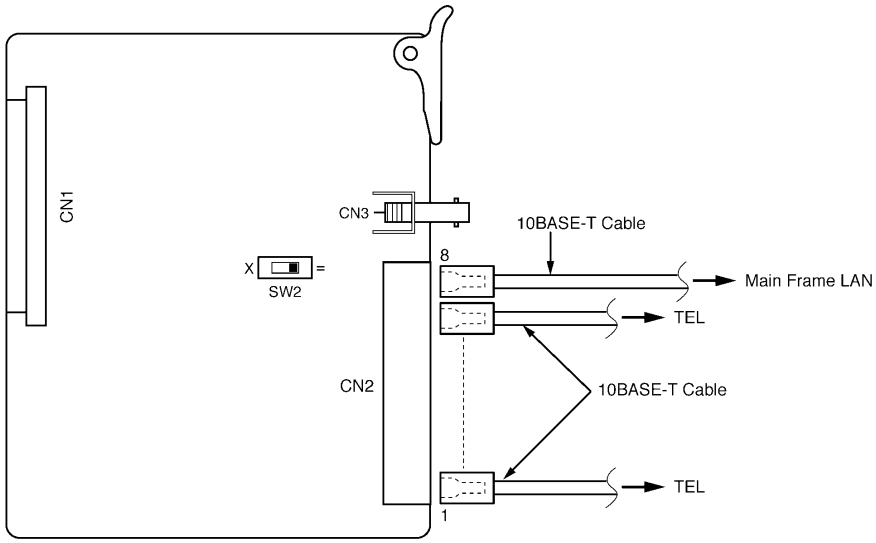


Figure 5-43 10Base-T Cable Connections

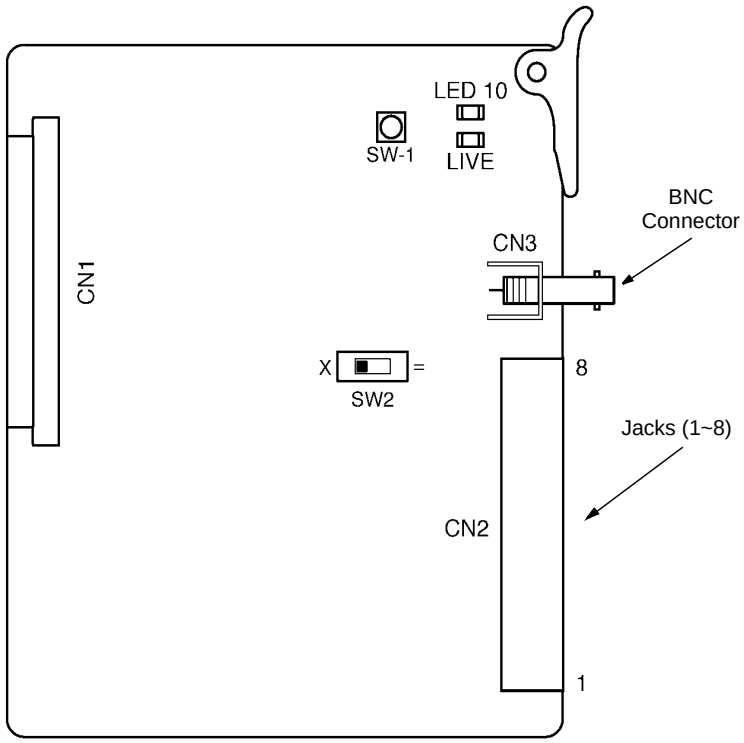


Figure 5-44 VDH2(8)-U( ) ETU

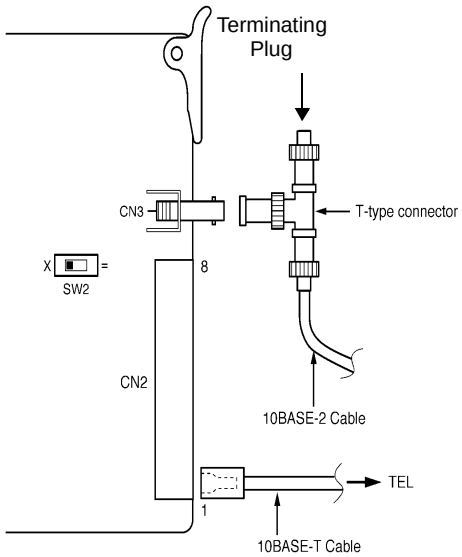


Figure 5-45 VDH2(8)-U( ) ETU Connectors

5.6.4 Installing the VDH2(8)-U( )

- Three ETUs can be installed in slots S2~S7.
- The 10Base-T ports on the VDH2(8)-U( ) ETU use 4-wire polar cables.
- When connecting a VDH2(8)-U( ) ETU to a multiline terminal, do not use under-carpet cables because the device becomes susceptible to outside noises. It is better to use EIA/TIA round cables instead of flat cables. When under-carpet cables are used, you must follow the installation instructions provided by the cable manufacturer. Also consider these precautions:
  - Limit the under-carpet cable length to 65 feet.
  - When using multiple pair cabling to connect the VDH2(8)-U( ) units to the multiline terminal, do not include analog lines in the same cable.
- When connecting a VDH2(8)-U( ) ETU, lead the cable connected to the ETU out through the clamp on the bottom right of the KSU.
- Figure 5-43 10Base-T Cable Connections shows cable connections to the LAN using 10Base-T cabling. Use an EIA/TIA category 3 (or higher) unshielded twisted pair cable. ***Do not use 10Base-T cable for overhead wiring or for outdoor wiring.***

5.6.5 Switch Settings and Jumpers

Refer to Table 5-31 VDH2(8)-U( ) ETU Default Switch Settings and Table 5-32 Jumper Settings.

Table 5-31 VDH2(8)-U( ) ETU Default Switch Settings

Switch	Setting	Description
SW1	N/A	Reset Switch
SW2	**X** Port 8 Normal Use Mode (LAN Cable Integration) **=** Port 8 10Base-T cascades to another VDH2(8)-U( ) ETU or HUB	Defines Port 8 communication mode.

Table 5-32 Jumper Settings

Port	Jumper	Setting
1	JP1 JP2	Both 1 and 2 LAN connection only Both 2 and 3 LAN station integration (default)
2	JP3 JP4	Both 1 and 2 LAN connection only Both 2 and 3 LAN station integration (default)
3	JP5 JP6	Both 1 and 2 LAN connection only Both 2 and 3 LAN station integration (default)
4	JP7 JP8	Both 1 and 2 LAN connection only Both 2 and 3 LAN station integration (default)
5	JP9 JP10	Both 1 and 2 LAN connection only Both 2 and 3 LAN station integration (default)
6	JP11 JP12	Both 1 and 2 LAN connection only Both 2 and 3 LAN station integration (default)
7	JP13 JP14	Both 1 and 2 LAN connection only Both 2 and 3 LAN station integration (default)

5.6.6 LED Indications

LED indications are located on both sides of the ETU as indicated in Figure 5-46 VDH2(8)-U( ) LED Indications.

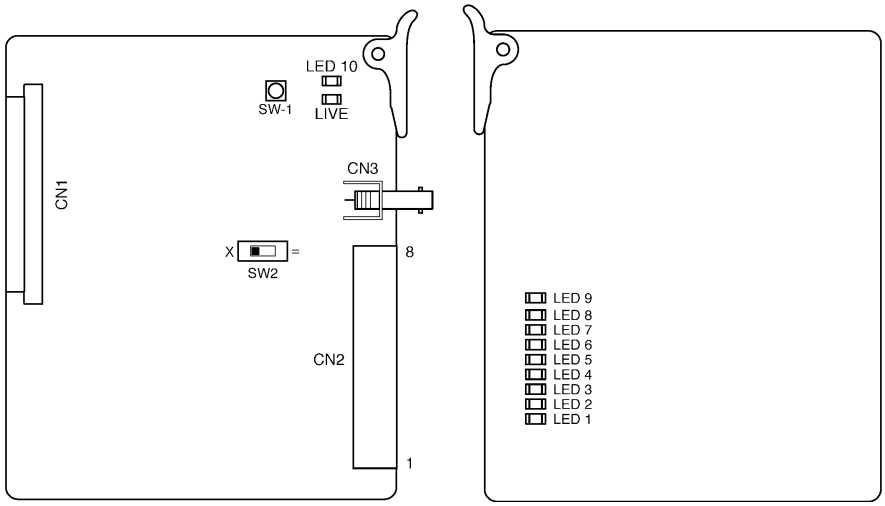


Figure 5-46 VDH2(8)-U( ) LED Indications

Table 5-33 VDH2(8)-U( ) ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Operation stopped, power on	Normal Operation	No Power
1	LAN connection	Green LAN Connection established Orange Terminal is Transmitting	Not Used	LAN inactive
2	LAN connection		Not Used	LAN inactive
3	LAN connection		Not Used	LAN inactive
4	LAN connection		Not Used	LAN inactive
5	LAN connection		Not Used	LAN inactive
6	LAN connection		Not Used	LAN inactive
7	LAN connection		Not Used	LAN inactive
8	LAN connection		Not Used	LAN inactive
9	10Base2 status	10Base2 sending	Not Used	10Base2 inactive
10	Intercom status	Intercom channel on some channel in use	Not Used	No intercom terminal used.

5.6.7 Connectors

The VDH2(8)-U( ) ETU has the following connectors:

- CN1 Connects to the backboard
- CN2 – CH1~7 Connects to Multiline Terminals
- CN2 – CH8 Connects to Multiline Terminal or cascades to another HUB
- CN3 Connects 10Base-2 cascade cables from another HUB or mainframe LAN

When SW2 is set to **X**, the following table indicates the pin assignments for the RJ-45 pins for CN2 – CH8.

TD indicates Transmit Data and RD indicates Receive Data.

Normal

Pin	Signaling
6	TD-
3	TD+
2	RD-
1	RD+

When SW2 is set to **=**, the following table indicates the pin assignments for the RJ-45 pins for CN2 – CH8.

Cascade

Pin	Signaling
6	RD-
3	RD+
2	TD-
1	TD+

☞ Cables that connect a terminal to a HUB are straight, and cables that connect HUB-to-HUB are crossed. Coreline uses straight cables only.

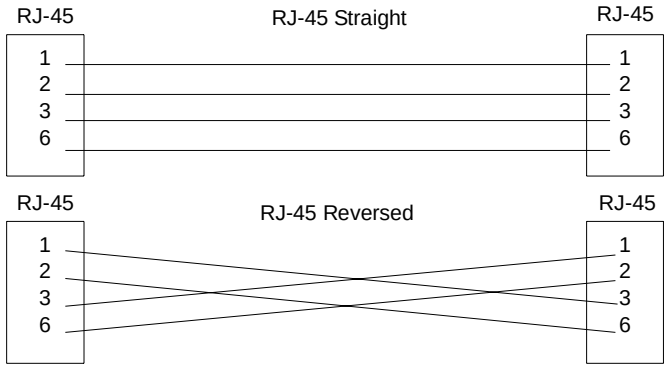


Figure 5-47 Cable Connection Comparison

SECTION 6
VOICE MAIL ETUS

6.1 CMS(2)/(4)-U( ) ETU

6.1.1 Description

The CMS(2)/(4)-U( ) ETU is a Digital Voice Mail system that supports a maximum of four ports.

This ETU is a PC platform installed in the Electra Elite that contains Flash ROM data storage for voice recording and application software. A digital signal processor/voice processing section handles the following functions:

- DTMF detection
- DTMF generation
- General tone detection
- FAX CNG tone detection
- PCM compression for audio recording/playback
- Automatic gain control (AGC)
- A serial port (direct connect speeds up to 19.2 Kbps)

This ETU provides 2 or 4 ports for digital voice mail. Refer to Table 5-34 Configuration Support Table.

Table 5-34 Configuration Support Table

Function	Configuration Support
Applications	Automated Attendant/Voice Mail with call forwarding (release transfer) Automated Attendant/Voice Mail without call forwarding (await answer transfer) Voice Mail only (No transfer)
Call Forwarding	Supported
Connections	Connects to backplane connector of the KSU
Hardware	One CMS(2)/(4)-U( ) ETU
Message Notification	Through message waiting lamp
Operator Console	100 (default) Positive disconnect: Digital Signal
MDM-F-20 Unit	Used for remote connection

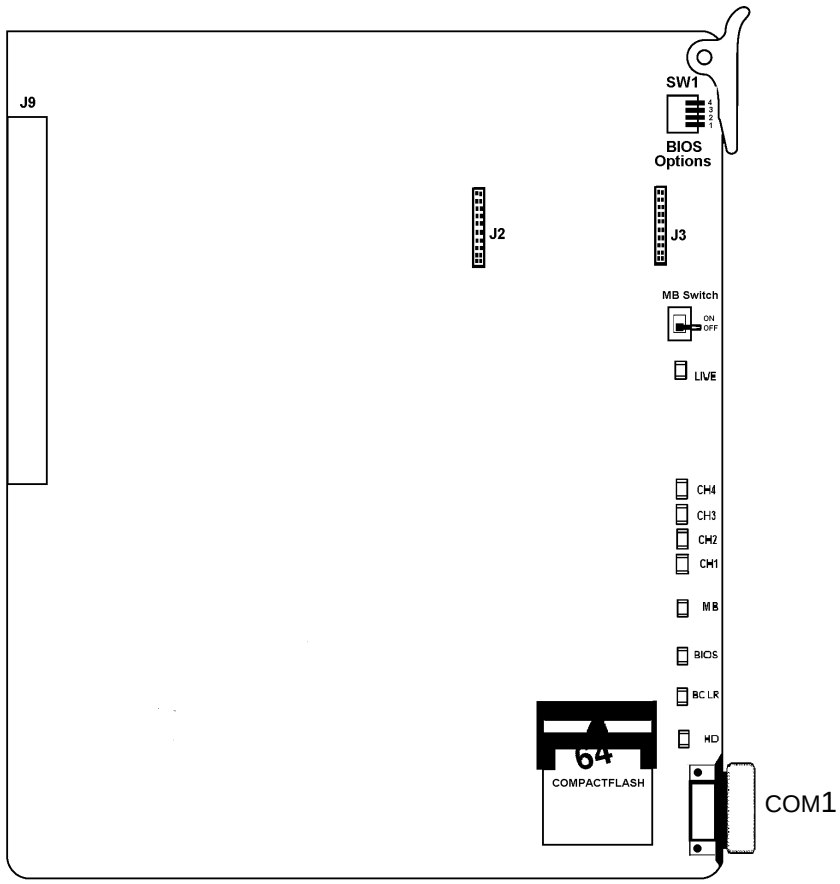


Figure 5-48 CMS(2)/(4)-U( ) ETU

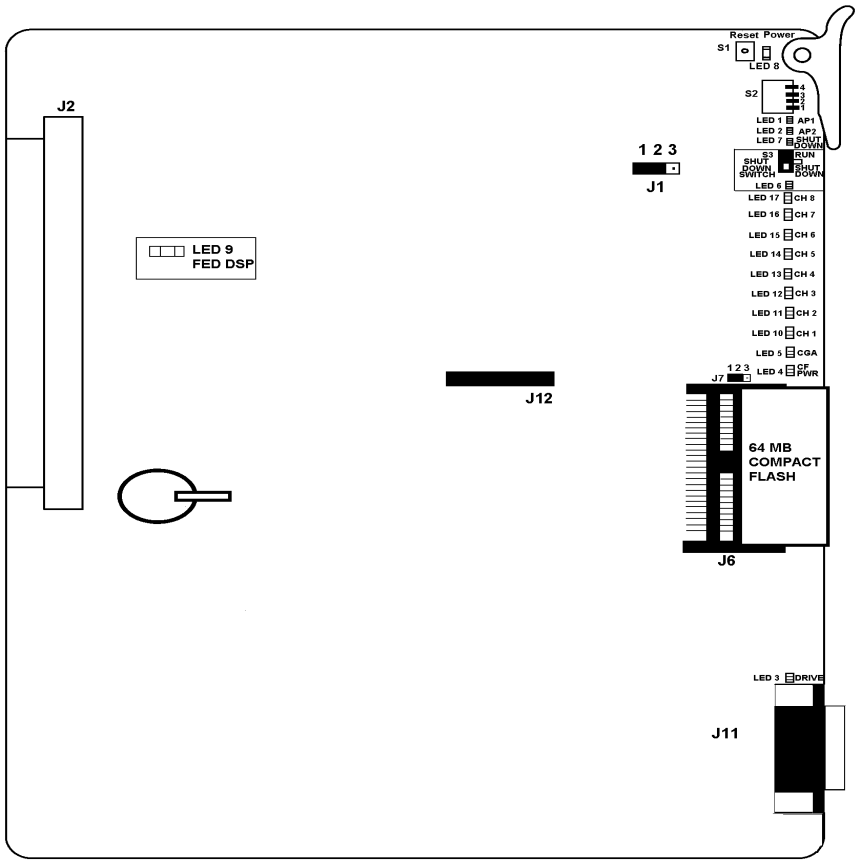


Figure 5-49 CMS-U30 ETU

6.1.2 Installation

Only one CMS(2)/(4)-U( ) ETU or CMS-U30 ETU can be installed in slots S1~S8.

Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.

When installing this ETU, make all ETU DIP switch setting changes before inserting it in the KSU. Ensure that KSU is off.

6.1.3 Switch Settings

For Revision Q00431 v 6.68 or higher, refer to Table 5-35 CMS(2)/(4)-U( ) ETU DIP Switch Functions.

Table 5-35 CMS(2)/(4)-U( ) ETU DIP Switch Functions

DIP 1	DIP 2	DIP 3	DIP 4	Description
ON				To enable HostKey and run Manufacturing Test (NEC Production only)
ON	ON			To enable HostKey with floppy disk redirection and run Manufacturing Test (NEC Production only)
		ON		To connect to CoSession using modem instead of direct cable connection
			ON	To start BRU Host with direct cable connection
		ON	ON	To start BRU Host with modem connection
	ON		ON	To connect to CoSession using direct cable connection but not start voice mail software (Troubleshooting or Maintenance Mode)

☞ *Used for Revision Q00431 v 6.68 or higher.*

6.1.4 LED Indications

Refer to Table 5-36 CMS(2)/(4)-U( ) ETU LED Indications

Table 5-36 CMS(2)/(4)-U( ) ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Receiving Power	Not Used	No Power
CH1	Port Status	Busy	Not Used	Idle/Not Used
CH2	Port Status	Busy	Not Used	Idle/Not Used
CH3	Port Status	Busy	Not Used	Idle/Not Used
CH4	Port Status	Busy	Not Used	Idle/Not Used
MB	MB Switch Status	ON	Not Used	OFF
BIOS	DOS Status	BIOS Error	Not Used	No error
BCLR	Application Status	**Red** DOS started (VM Not Ready) **Green** VM Running **Orange** Error	Not Used	Idle
☞ *If BCLR LED is orange, check error type on console screen. After error is corrected, LED automatically changes to green. Do Not connect link between console and ETU until BCLR turns green during booting.*				
HD	Flash Status	Not Used	Compact Flash Disk Active	Flash Inactive

☞ *Do not reset the ETU while the HD LED is flashing.*

Table 5-37 CMS-U30 ETU LED Indications

LED	Name	Description
LED 1	APP1	Indicates status of voice mail application software Green Application running without errors Amber Application running with errors Red Application not running
LED 2	APP 2	Not Used
LED 3	Drive	HDD active light is red when the hard drive is accessed ☞ *Do not reset the ETU while this switch is on.*
LED 4	CF Power	On when shutdown switch in Run to indicate power on the ETU
LED 5	ICGA	Live LED flashes every 125 ms during normal operation
LED 6	Shut Down Switch	Indicates that the switch has no software control. On red only when SHUTDOWN switch is in Run
LED 7	Shutdown	On red when SHUTDOWN switch is in SHUT DOWN to indicate that voice mail can be safely removed form the KSU
LED 8	Power	On red when ETU is receiving power from the KSU
LED 9	FED DSP	Used only for development purposes
LED 10	CH 1	On red when voice channel 1 is Off Hook
LED 11	CH 2	On red when voice channel 2 is Off Hook
LED 12	CH 3	On red when voice channel 3 is Off Hook
LED 13	CH 4	On red when voice channel 4 is Off Hook
LED 14	CH 5	On red when voice channel 5 is Off Hook
LED 15	CH 6	On red when voice channel 6 is Off Hook
LED 16	CH 7	On red when voice channel 7 is Off Hook
LED 17	CH 8	On red when voice channel 8 is Off Hook

☞ The first four channel LEDs are also used during startup to show that the BICOM driver is loaded (LED 1), Scan disk successfully completed (LED 2), CoSession Host successfully Loaded (LED 3), and voice mail started successfully (LED 4). After the system is up and running and all channels are ready to receive calls, these LEDs are Off. When voice mail does not start successfully, all eight channel LEDs and LED 1 are On.

6.1.5 CMS(2)/(4)-U( ) ETU Connectors

- J2 and J3
- Used to install the MDM-F-20 Unit
- J9
- Connects to the backboard
- 9-pin RS-232 (COM2)
- Not used (MDM-F-20 Unit)
- RJ-11 modem port (COM2)
- Remote connector on serial interface (MDM-F-20 Unit)
- 9-pin RS-232 (COM1)

  Local serial connector on main ETU for direct connection

6.1.6 CMS-U30 ETU Jumper Settings

J1	Used only on FMS/CMS
1 - 2	No external modem connected (default)
2 - 3	External modem connected

6.1.7 CMS-U30 ETU Connectors

- J2

  Connects to the backplane
- J6

  Used for Compact flash drive on FMS
- J10

  Not used.
- J11)

  COM port for console programming connection
- J12

  Port expansion connector for DSP-U30

6.2 CTI/VP(4)/(8)/(12)/(16)-U( ) ETU

6.2.1 Description

The CTI/VP(4)/(8)/(12)/(16)-U( ) ETU is a 4-, 8-, 12-, or 16-port Digital Voice Mail system that can support TeLANophy, inbound or outbound faxing and Hospitality/ HVM applications.

The EliteMail VP cannot support TeLANophy or faxing and Hospitality/HVM applications, but it can be upgraded to EliteMail CTI when these features are required.

For a 4- or 8-port system, only the System Board and one slot are required. For the 12- or 16-port system, the Daughter Board that attaches to the System board, and the Port Expansion Board that requires another slot are also required.

This ETU is a PC platform, installed in the Electra Elite IPK system, that contains hard disk space for voice recording storage and application software. A digital signal processor/voice processing section handles the following functions:

- DTMF detection/generation
- General tone detection
- FAX CNG tone detection
- PCM compression for audio recording/playback
- Automatic gain control
- A serial port (direct connect speeds up to 115,200 bps) used for direct connection console programming and backup/restore
- A LAN port with an RJ-45 connector (activated only with CTI)
- Up to two fax ports (activated only with CTI)
- A built-in modem for remote console programming that supports up to 19.2 Kbps

Table 5-38 Configuration Support

Function	Support
Applications	Automated Attendant/Voice Mail with call forwarding (release transfer) Automated Attendant/Voice Mail without call forwarding (await answer transfer) Voice Mail only (no transfer)
Call Forwarding	Supported
Connections	Connects to backplane of the KSU RJ-45 LAN connection RJ-11 Modem connection VGA connection for monitor support PS2 Keyboard and Mouse connections
Hardware	One CTI/VP(4)/(8)/(12)/(16)-U( ) ETU
Message Notification	Uses message waiting lamp
Operator Console	100 (default) Positive connect: Digital signal

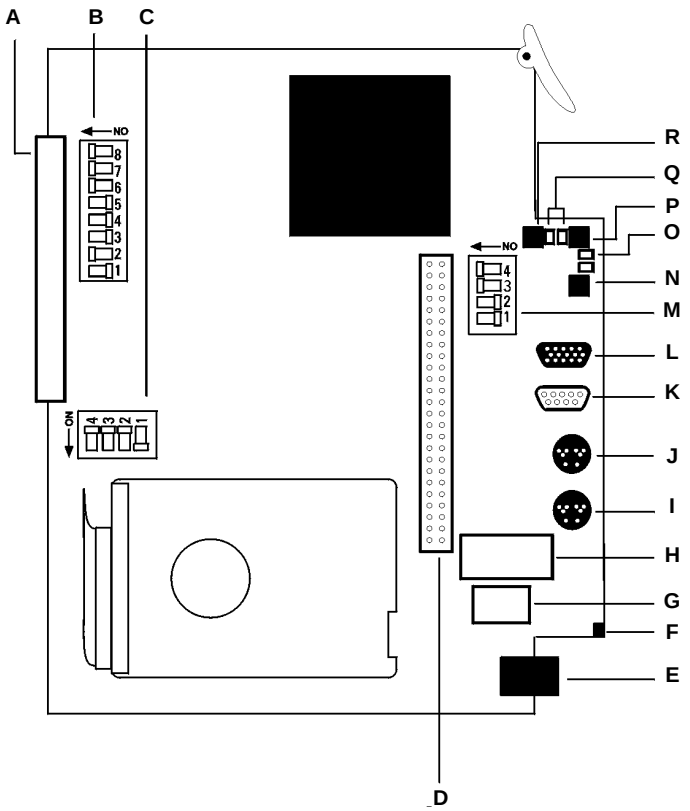


Figure 5-50 EliteMail CTI System Board

6.2.1.1 System Board Components

The components identified in Figure 5-50 EliteMail CTI System Board are listed and described in Table 5-39 System Board Components.

Table 5-39 System Board Components

Item	Description
A	Backplane connector
B	Switch SW2 Not used. Keep indicated default settings.
C	Switch SW1 Not used. Keep indicated default settings.
D	Port Expansion Board (PEB) cable
E	Modem connector
F	Hard Drive (HD) LED
G	Universal Serial Bus (USB) connector
H	Local Area Network (LAN) connector
I	Keyboard connector
J	Mouse connector
K	COM Serial Port connector
L	VGA Monitor connector
M	Switch SW3 DIP switch 1 default is Off so the voice messaging application starts when the board is turned On. Set this switch On to start OS/2 software only. DIP switch 2 default is Off for direct serial remote access connections. Set this switch On for modem connections. DIP switches 3 and 4 are not used and should be left On.
N	The power button cuts the power to the board from the PC and the hard drive and should not be used.

Table 5-39 System Board Components(Continued)

Item	Description
O	Voice messaging software LED. Green when software is active Amber when active with possible application problem Red when inactive or shut down
P	Shutdown switch Default is On. Place Off to shut down the software and system board properly before turning off the telephone system and disconnecting the system board. Place On before restarting – The board restarts only when the switch is On.
Q	Shutdown LED Red when switch is On Green when switch is Off After the LED goes off, turn off power to the KSU and disconnect the board.
R	Make Busy switch and LED Do not use. Must always be On with a red LED.

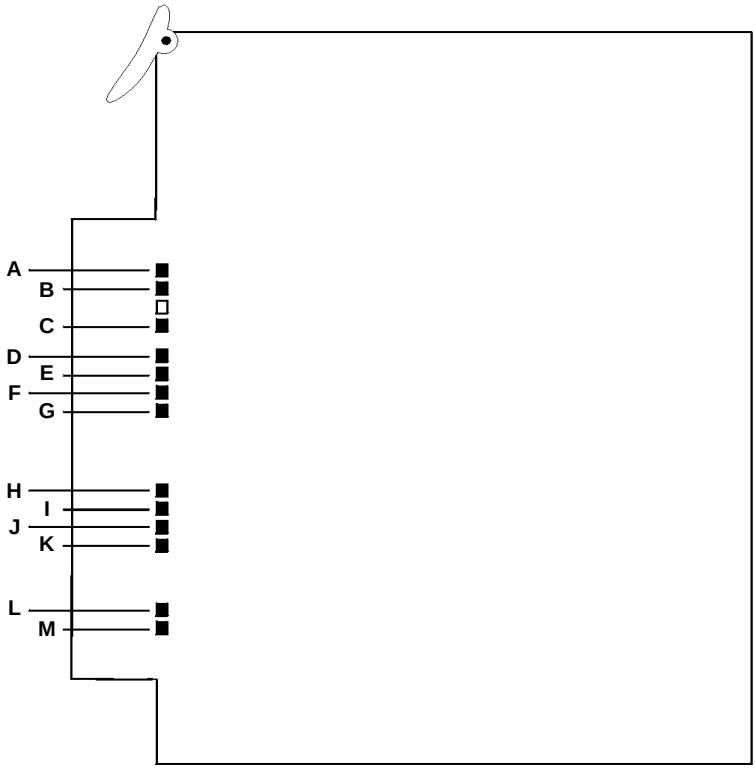


Figure 5-51 EliteMail CTI Daughter Board

6.2.1.2 Daughter Board Components

The components identified in Figure 5-51 EliteMail CTI Daughter Board are listed and described in Table 5-40 Daughter Board Components.

Table 5-40 Daughter Board Components

Item	Description
A	F206 LED
B	CGA LED
C	Application LED
D~K	VM Channel LEDs 1~8 respectively
L, M	Fax Channel LEDs Channel 1, Channel 2

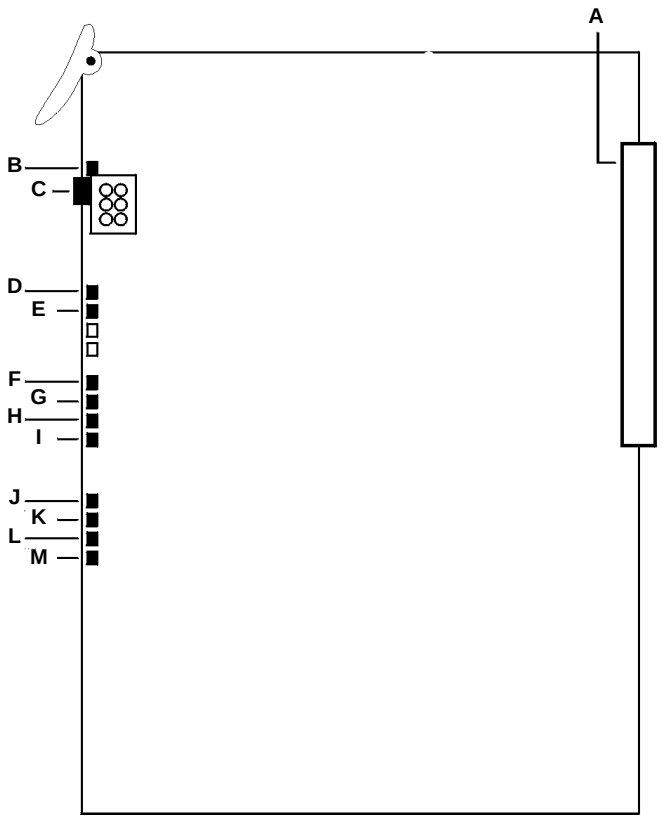


Figure 5-52 EliteMail CTI Port Expansion Board

6.2.1.3 Port Expansion Board

The components identified in Figure 5-52 EliteMail CTI Port Expansion Board are listed and described in Table 5-41 Port Expansion Board Components.

Table 5-41 Port Expansion Board Components

Item	Description
A	Backplane connector
B	MB LED – Always On when board is installed
C	MB switch – Do not use, leave On
D	F206 LED
E	CGA Live LED
F~M	VM Channels 9~16, respectively

6.2.2 Installation

Only one CTI/VP(4)/(8)/(12)/(16)-U( ) ETU can be installed in a system.

This ETU shares the total number of station ports in the system.

This ETU shares the total number of station ports in the system.

☞ Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU. .

When installing this ETU, make all ETU DIP switch setting changes before inserting it in the KSU. Ensure that KSU is off.

6.2.3 LED Indications

The HD LED flashes red when the hard drive is active.

☞ *Do not reset the ETU when the HD LED is flashing.*

6.3 FMS(2)/(4)/(8)-U( ) ETU

6.3.1 Description

The FMS(2)/(4)/(8)-U( ) ETU is a Digital Voice Mail system that supports a maximum of eight ports.

This ETU is a PC platform installed in the Electra Elite that contains Flash ROM data storage for voice recording and application software. A digital signal processor/voice processing section handles the following functions:

- DTMF detection
- DTMF generation
- General tone detection
- FAX CNG tone detection
- PCM compression for audio recording/playback
- Automatic gain control (AGC)
- A serial port (direct connect speeds up to 19.2 Kbps)

This ETU provides 2-, 4-, or 8-ports for digital voice mail. Refer to Table 5-42 Configuration Support Table.

Table 5-42 Configuration Support Table

Function	Configuration Support
Applications	Automated Attendant/Voice Mail with call forwarding (release transfer) Automated Attendant/Voice Mail without call forwarding (await answer transfer) Voice Mail only (No transfer)
Call Forwarding	Supported
Connections	Connects to backplane connector of the KSU
Hardware	One FMS(2)/(4)/(8)-U( ) ETU
Message Notification	Through message waiting lamp
Operator Console	100 (default) Positive disconnect: Digital Signal
MDM-F-20 Unit	Used for remote connection

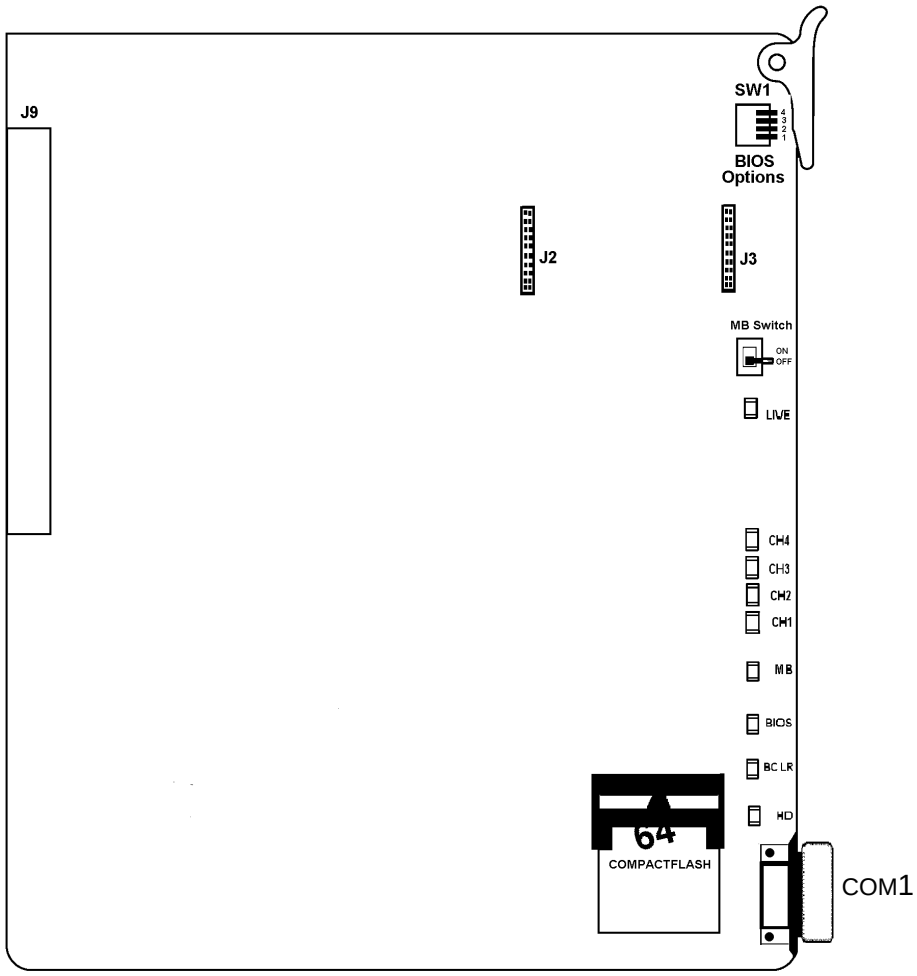


Figure 5-53 FMS(2)/(4)-U( ) ETU

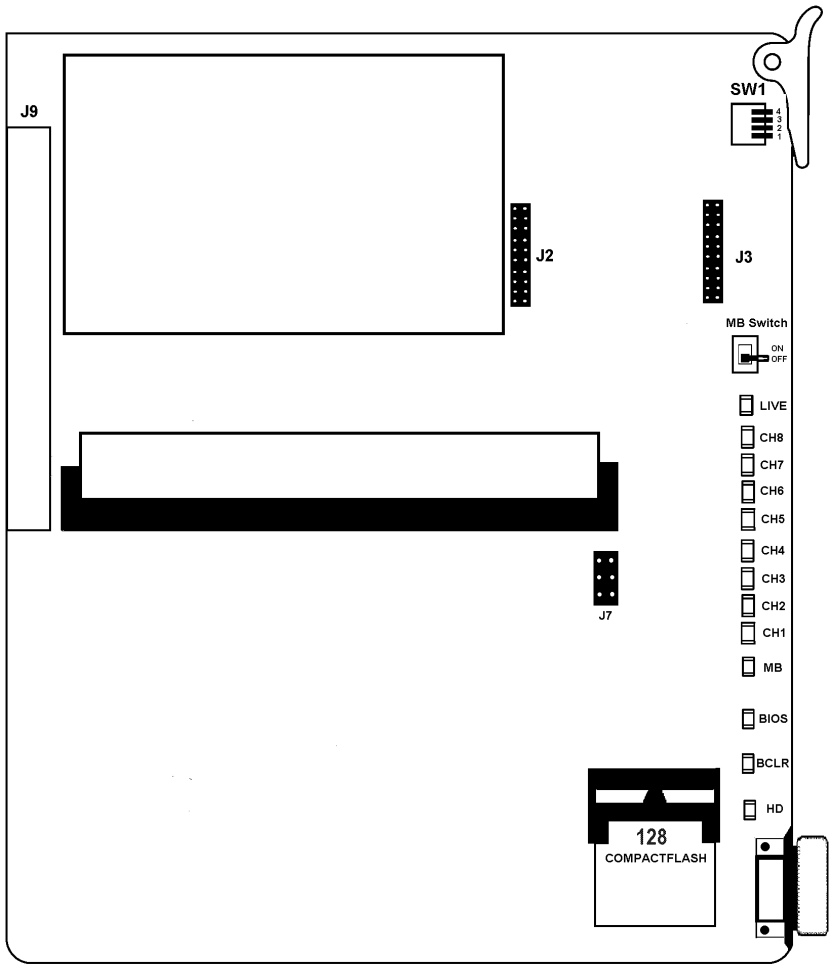


Figure 5-54 FMS(8)-U( ) ETU

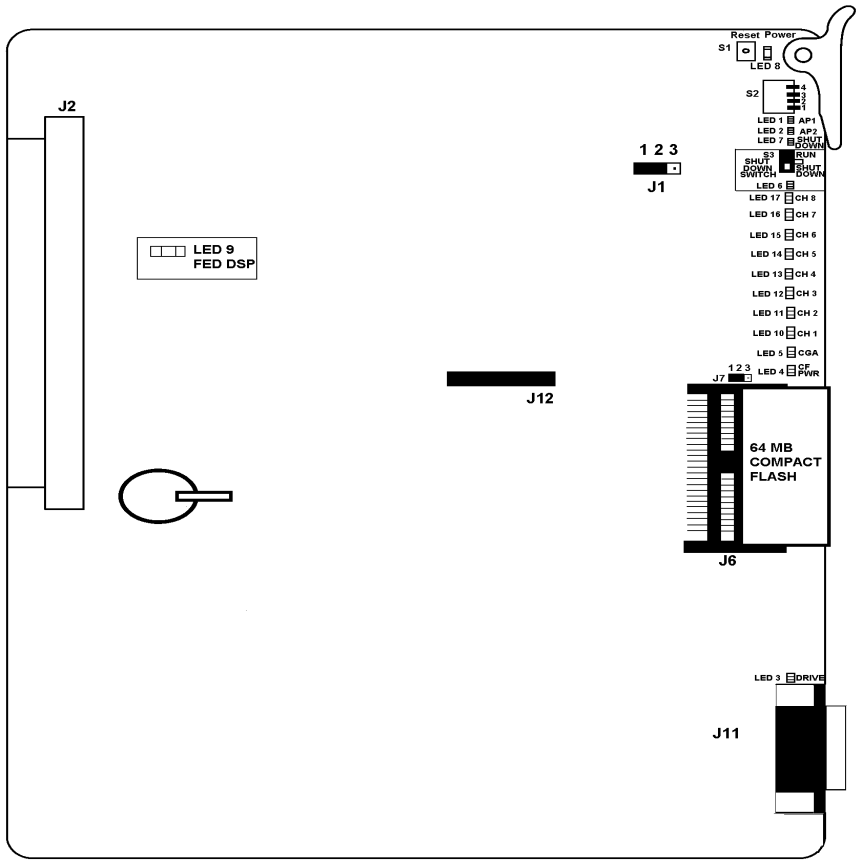


Figure 5-55 FMS-U30 ETU

6.3.2 Installation

Only one FMS(2)/(4)/(8)-U( ) ETU or one FMS-U30 ETU can be installed in slots S1~S8.

This ETU shares the total number of station ports in the system.

☞ Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.

When installing this ETU, make all ETU DIP switch setting changes before inserting it in the KSU. Ensure that KSU is off.

6.3.3 Switch Settings

Refer to Table 5-43 FMS(2)/(4)/(8)-U( ) ETU Switch Settings, for Revision Q26031 v 6.65 or lower. for Revision Q26031 v 6.68 or higher, refer to Table 5-44 FMS(2)/(4)/(8)-U( ) ETU DIP Switch Functions.

Table 5-43 FMS(2)/(4)/(8)-U( ) ETU Switch Settings

Switch	Description
1	Normally Off (On to enable COM1)
2	Normally Off When 1 and 2 are both On, COM1 is enabled for HOSTKEY and the VM application is stopped for Maintenance.
3	On to enable COM2 for remote RS-232/ RJ-11. Off to allow COM1 local connection.
4	Not Used

☞ *Used for Revision Q26031 v 6.65 or lower.*

Table 5-44 FMS(2)/(4)/(8)-U( ) ETU DIP Switch Functions

DIP 1	DIP 2	DIP 3	DIP 4	Description
ON				To enable HostKey and run Manufacturing Test (NEC Production only)
ON	ON			To enable HostKey with floppy disk redirection and run Manufacturing Test (NEC Production only)
		ON		To connect to CoSession using modem instead of direct cable connection
			ON	To start BRU Host with direct cable connection
		ON	ON	To start BRU Host with modem connection
	ON		ON	To connect to CoSession using direct cable connection but not start voice mail software (Troubleshooting or Maintenance Mode)

☞ *Used for Revision Q05631 v 6.68 or higher.*

6.3.4 LED Indications

Refer to Table 5-45 FMS(2)/(4)/(8)-U( ) ETU LED Indications.

Table 5-45 FMS(2)/(4)/(8)-U( ) ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Receiving Power	Not Used	No Power
CH1	Port Status	Busy	Not Used	Idle/Not Used
CH2	Port Status	Busy	Not Used	Idle/Not Used
CH3	Port Status	Busy	Not Used	Idle/Not Used
CH4	Port Status	Busy	Not Used	Idle/Not Used
CH5	Port Status	Busy	Not Used	Idle/Not Used
CH6	Port Status	Busy	Not Used	Idle/Not Used
CH7	Port Status	Busy	Not Used	Idle/Not Used
CH8	Port Status	Busy	Not Used	Idle/Not Used
MB	MB Switch Status	ON	Not Used	OFF
BIOS	DOS Status	BIOS Error	Not Used	No error
BCLR	Application Status	**Red** DOS started (VM Not Ready) **Green** VM Running **Orange** Error	Not Used	Idle

☞ *If BCLR LED is orange, check error type on console screen. After error is corrected, LED automatically changes to green. Do Not connect link between console and ETU until BCLR turns green during booting.*

HD	Flash Status	Not Used	Compact Flash Disk Active	Flash Inactive

☞ *Do not reset the ETU while the HD LED is flashing.*

Refer to Refer to Table 5-46 FMS-U30 ETU LED Indications..

Table 5-46 FMS-U30 ETU LED Indications

LED	Name	Description
LED 1	APP1	Indicates status of voice mail application software Green Application running without errors Amber Application running with errors Red Application not running
LED 2	APP 2	Not Used
LED 3	Drive	HDD active light is red when the hard drive is accessed ☞ *Do not reset the ETU while this switch is on.*
LED 4	CF Power	On when shutdown switch in Run to indicate power on the ETU
LED 5	ICGA	Live LED flashes every 125 ms during normal operation
LED 6	Shut Down Switch	Indicates that the switch has no software control. On red only when SHUTDOWN switch is in Run
LED 7	Shutdown	On red when SHUTDOWN switch is in SHUT DOWN to indicate that voice mail can be safely removed form the KSU
LED 8	Power	On red when ETU is receiving power from the KSU
LED 9	FED DSP	Used only for development purposes
LED 10	CH 1	On red when voice channel 1 is Off Hook
LED 11	CH 2	On red when voice channel 2 is Off Hook
LED 12	CH 3	On red when voice channel 3 is Off Hook
LED 13	CH 4	On red when voice channel 4 is Off Hook
LED 14	CH 5	On red when voice channel 5 is Off Hook
LED 15	CH 6	On red when voice channel 6 is Off Hook
LED 16	CH 7	On red when voice channel 7 is Off Hook
LED 17	CH 8	On red when voice channel 8 is Off Hook

☞ *The first four channel LEDs are also used during startup to show that the BICOM driver is loaded (LED 1), Scan disk successfully completed (LED 2), CoSession Host successfully Loaded (LED 3), and voice mail started successfully (LED 4). After the system is up and running and all channels are ready to receive calls, these LEDs are Off. When voice mail does not start successfully, all eight channel LEDs and LED 1 are On.*

6.3.5 FMS(2)/(4)/(8)-U( ) ETU Connectors

- J2 and J3

  Used to install the MDM-F-20 Unit

- J9

  Connects to the backboard

- 9-pin RS-232 (COM2)

  Not used (MDM-F-20 Unit)

- RJ-11 modem port (COM2)

  Remote connector on serial interface (MDM-F-20 Unit)

- 9-pin RS-232(COM1)

  Local serial connector on main ETU for direct connection

6.3.6 FMS-U30 ETU Jumper Settings

J1	Used only on FMS/CMS
1 - 2	No external modem connected (default)
2 - 3	External modem connected

6.3.7 FMS-U30 ETU Connectors

The FMS-U30 ETU has the following connectors:

- J2

  Connects to the backplane

- J6

  Used for Compact flash drive on FMS

- J11)

  COM port for console programming connection

- J12

  Port expansion connector for DSP-U30

6.4 VMS(2)/(4)/(8)-U( ) ETU

6.4.1 Description

The VMS(2)/(4)/(8)-U( ) ETU is a 2-, 4-, or 8-port Digital Voice Mail system.

This ETU is a PC platform installed in the Electra Elite and contains hard disk space for voice recording storage and application software. A digital signal processor/voice processing section handles the following functions:

- DTMF detection
- DTMF generation
- General tone detection
- FAX CNG tone detection
- PCM compression for audio recording/playback
- Automatic gain control (AGC)
- A serial port (direct connect speeds up to 19.2 Kbps) to connect external modem

This ETU provides 2-, 4-, or 8-ports for digital voice mail. The 2- and 4-port require the included digital signal processor (DSP); the 8-port configuration requires a DSP-F-21 Unit. Refer to Table 5-47 Configuration Support Table.

Table 5-47 Configuration Support Table

Function	Configuration Support
Applications	Automated Attendant/Voice Mail with call forwarding (release transfer) Automated Attendant/Voice Mail without call forwarding (await answer transfer) Voice Mail only (No transfer)
Call Forwarding	Supported
Connections	Connects to backplane connector of the KSU
Hardware	One VMS(2)/(4)/(8)-U( ) ETU
Message Notification	Through message waiting lamp
MDM-F-20 Unit	Used for remote connection

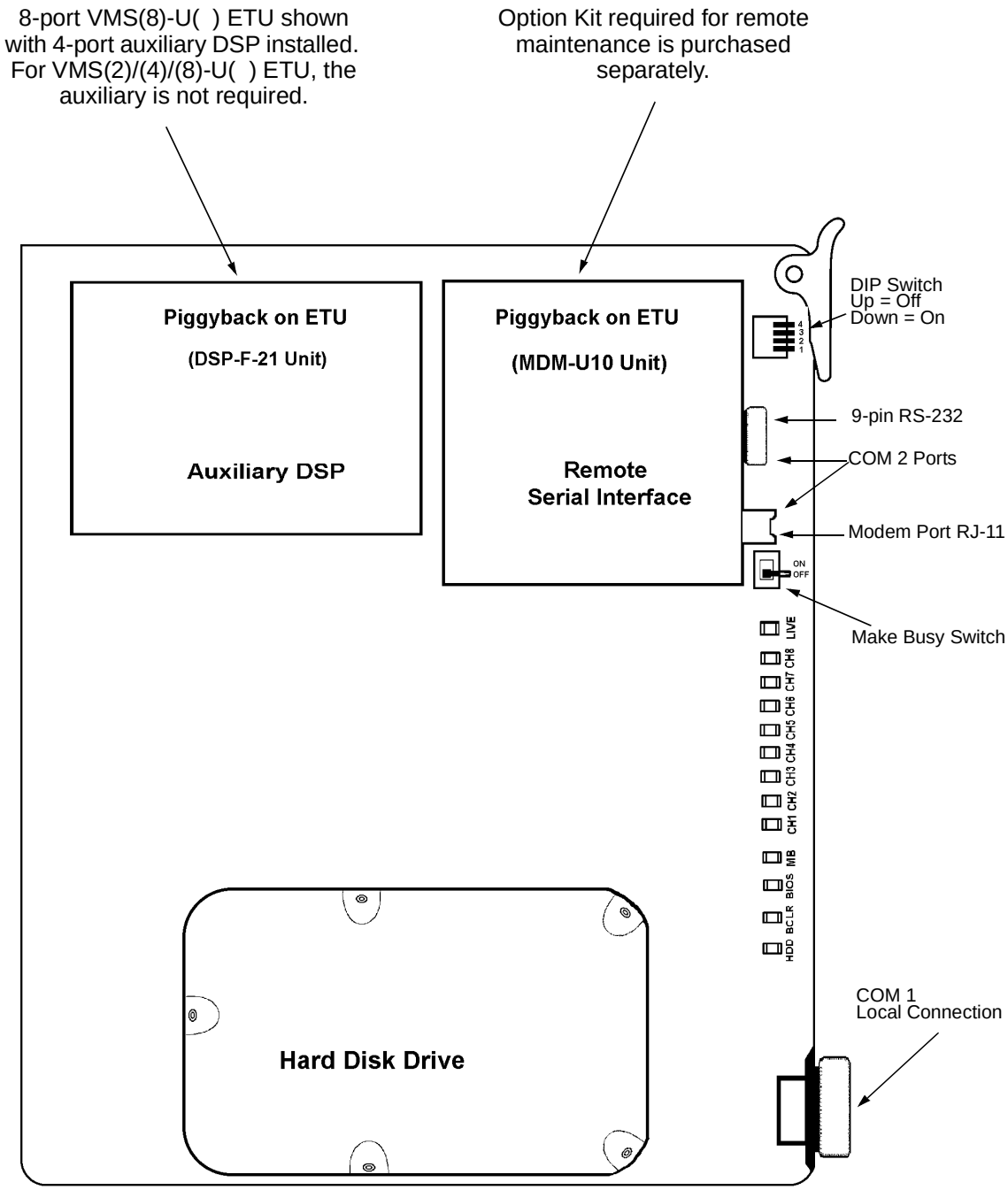


Figure 5-56 VMS(2)/(4)/(8)-U( ) ETU

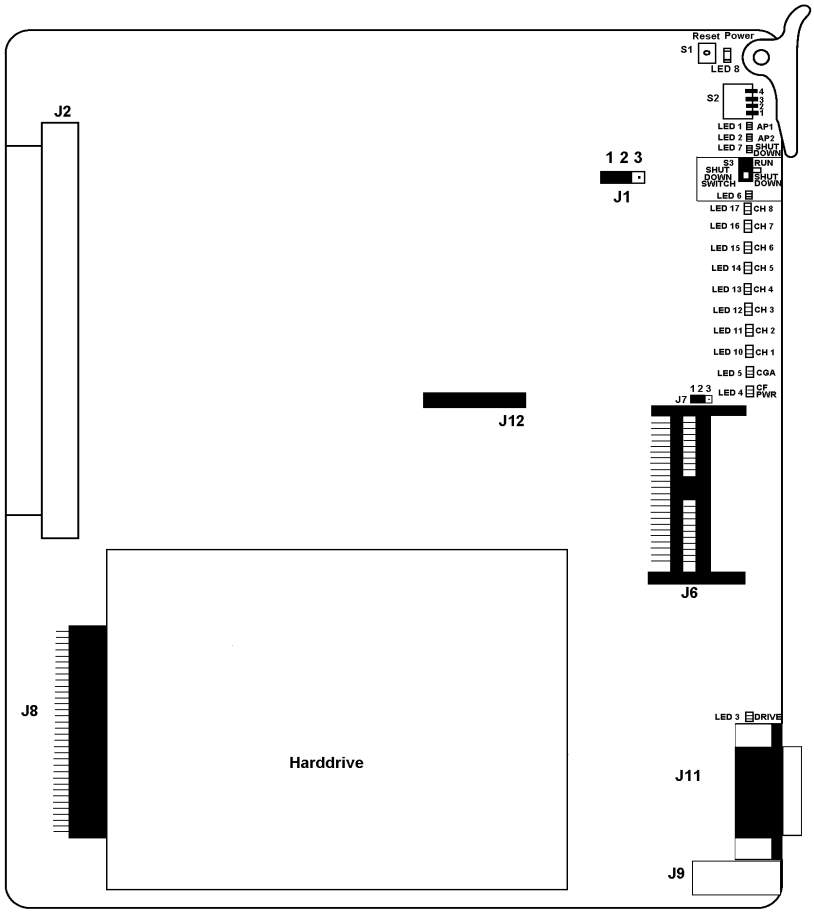


Figure 5-57 VMS-U30 ETU

6.4.2 Installation

The VMS(2)-U10 ETU has two channels of built-in Voice Mail.

The VMS(4)-U10 ETU has four channels of built-in Voice Mail.

The VMS(8)-U10 ETU has eight channels of built-in Voice Mail.

Only one VMS(2)/(4)/(8)-U( ) ETU or one VMS-U30 can be installed in each system in slots S1~S8.

This ETU shares the total number of station ports in the system.

☞ Each system can have one CTI/VP, CMS, FMS, VMS, or IVR ETU.

When installing this ETU, make all ETU DIP switch setting changes before inserting it in the KSU. Ensure that KSU is off.

6.4.3 Switch Settings

Refer to Table 5-48 VMS(2)/(4)/(8)-U( ) ETU DIP Switch Settings. (Revision Q30931 v 6.65 or lower). For Revision Q30931 v 6.68 or higher, refer to Table 5-49 VMS(2)/(4)/(8)-U( ) ETU DIP Switch Functions.

Table 5-48 VMS(2)/(4)/(8)-U( ) ETU DIP Switch Settings

Switch	Description
1	Normally Off (On to enable COM1)
2	Normally Off When 1 and 2 are both On, COM1 is enabled for HOSTKEY and the VM application is stopped for Maintenance.
3	On to enable COM2 for remote RS-232/RJ-11. Off to allow COM1 local connection.
4	Not Used

☞ *Used for Revision Q30931 v 6.65 or lower.*

Table 5-49 VMS(2)/(4)/(8)-U( ) ETU DIP Switch Functions

DIP 1	DIP 2	DIP 3	DIP 4	Description
ON				To enable HostKey and run Manufacturing Test (NEC Production only)
ON	ON			To enable HostKey with floppy disk redirection and run Manufacturing Test (NEC Production only)
		ON		To connect to CoSession using modem instead of direct cable connection
			ON	To start BRU Host with direct cable connection
		ON	ON	To start BRU Host with modem connection
	ON		ON	To connect to CoSession using direct cable connection but not start voice mail software (Troubleshooting or Maintenance Mode)

☞ *Used for Revision Q00631 v 6.68 or higher.*

6.4.4 LED Indications

Refer to Table 5-50 VMS(2)/(4)/(8)-U( ) ETU LED Indications.

Table 5-50 VMS(2)/(4)/(8)-U( ) ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Receiving power	Not Used	No Power
CH1	Port status	Busy	Not Used	Idle/Not used
CH2	Port status	Busy	Not Used	Idle/Not used
CH3	Port status	Busy	Not Used	Idle/Not used
CH4	Port status	Busy	Not Used	Idle/Not used
CH5	Port status	Busy	Not Used	Idle/Not used
CH6	Port status	Busy	Not Used	Idle/Not used
CH7	Port status	Busy	Not Used	Idle/Not used
CH8	Port status	Busy	Not Used	Idle/Not used
MB	MB Switch status	ON	Not Used	OFF
BIOS	BIOS Error Status	BIOS Error	Not Used	No error
BCLR	Application status	**Red** DOS started (VM not ready) **Green** VM running **Orange** Error	Not Used	Idle

☞ *If BCLR LED is orange, check error type on console screen. After error is corrected, LED automatically changes to green. Do Not connect link between console and ETU until BCLR turns green during booting.*

HDD	Hard Disk status	Not Used	Hard Disk active	Hard Disk inactive

☞ *Do not reset the ETU while the HDD LED is flashing.*

Refer to Table 5-51 VMS-U30 ETU LED Indications.

Table 5-51 VMS-U30 ETU LED Indications

LED	Name	Description
LED 1	APP1	Indicates status of voice mail application software Green Application running without errors Amber Application running with errors Red Application not running
LED 2	APP 2	Not Used
LED 3	Drive	HDD active light is red when the hard drive is accessed ☞ *Do not reset the ETU while this switch is On.*
LED 4	CF Power	On when shutdown switch in Run to indicate power on the ETU
LED 5	ICGA	Live LED flashes every 125 ms during normal operation
LED 6	Shut Down Switch	Indicates that the switch has no software control. On red only when SHUTDOWN switch is in Run
LED 7	Shutdown	On red when SHUTDOWN switch is in SHUT DOWN to indicate that voice mail can be safely removed form the KSU
LED 8	Power	On red when ETU is receiving power from the KSU
LED 9	FED DSP	Used only for development purposes
LED 10	CH 1	On red when voice channel 1 is Off Hook
LED 11	CH 2	On red when voice channel 2 is Off Hook
LED 12	CH 3	On red when voice channel 3 is Off Hook
LED 13	CH 4	On red when voice channel 4 is Off Hook
LED 14	CH 5	On red when voice channel 5 is Off Hook
LED 15	CH 6	On red when voice channel 6 is Off Hook
LED 16	CH 7	On red when voice channel 7 is Off Hook
LED 17	CH 8	On red when voice channel 8 is Off Hook

☞ *The first four channel LEDs are also used during startup to show that the BICOM driver is loaded (LED 1), Scan disk successfully completed (LED 2), CoSession Host successfully Loaded (LED 3), and voice mail started successfully (LED 4). After the system is up and running and all channels are ready to receive calls, these LEDs are Off. When voice mail does not start successfully, all eight channel LEDs and LED 1 are on.*

6.4.5 VMS(2)/(4)/(8)-U( ) ETU Connectors

- CN1

  Connects to the backboard

- 9-pin RS-232(COM2)

  Not used (MDM-F-20 Unit)

- RJ-11 modem port(COM2)

  Remote connector on serial interface (MDM-F-20 Unit)

- 9-pin RS-232(COM1)

  Local Serial connector on main ETU for direct connection

6.4.6 VMS-U30 ETU Jumper Settings

J7	Used only on VMS
1 - 2	Compact flash is master drive
2 - 3	Hard Drive is master drive (default)

6.4.7 VMS-U30 ETU Connectors

- J2

  Connects to the backplane

- J6

  Used for Compact flash drive on FMS

- J8

  Used for Harddrive

- J9

  RJ-45 LAN connector for network connection

- J11

  COM port for console programming connection

- J12

  Port expansion connector for DSP-U30

SECTION 7
OPTIONAL ETUS

This section describes optional Electronic Telephone Units that provide additional functions for an Electra Elite 48 system.

7.1 ACD(8)-U( ) ETU

7.1.1 Description

The ACD(8)-U( ) ETU interfaces the Elite ACD Plus Server to the Electra Elite KSU. Elite ACD Plus provides Windows-based software programs to enhance the ACD features of the Electra Elite Key Telephone System.

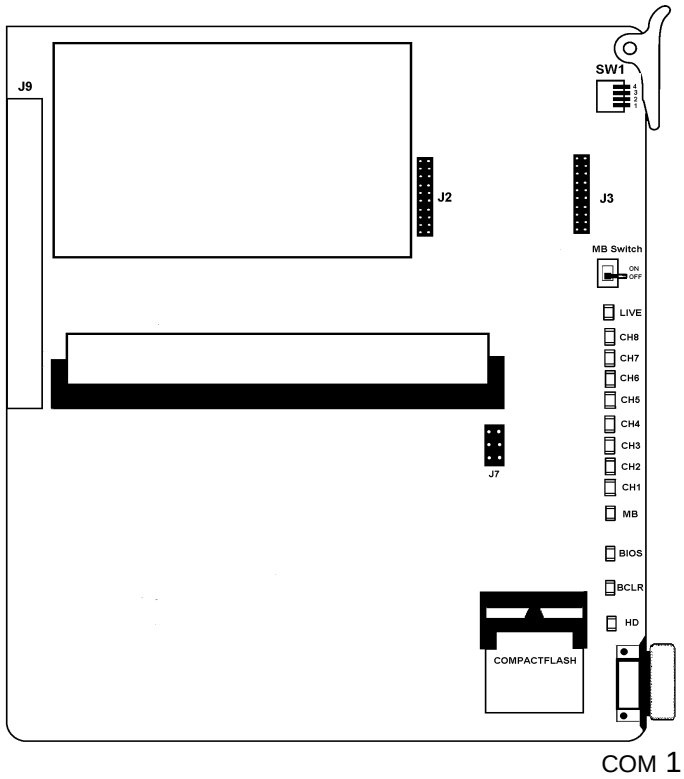


Figure 5-58 ACD(8)-U( ) ETU

7.1.2 Installation

Only one ACD(8)-U( ) can be installed in slots S2~S7. Slot S6 is recommended.

7.1.3 LED Indications

Table 5-52 ACD(8)-U( ) ETU LED Indications

LED	Description	On	Flashing	Off
LIVE	ETU status	Receiving power	Not Used	No Power
CH1	Port status	Busy	Not Used	Idle/Not used
CH2	Port status	Busy	Not Used	Idle/Not used
CH3	Port status	Busy	Not Used	Idle/Not used
CH4	Port status	Busy	Not Used	Idle/Not used
CH5	Port status	Busy	Not Used	Idle/Not used
CH6	Port status	Busy	Not Used	Idle/Not used
CH7	Port status	Busy	Not Used	Idle/Not used
CH8	Port status	Busy	Not Used	Idle/Not used
MB	MB Switch status	ON	Not Used	OFF
BIOS	BIOS Error status	BIOS Error	Not Used	No error
BCLR	Application status	**Red** DOS started (ACD not ready) **Green** ACD running	Not Used	Idle
☞ If BCLR LED is orange, check error type on console screen. After error is corrected, LED automatically changes to green. Do Not connect link between console and ETU until BCLR turns green during booting.				
HD	Compact Flash status	Not Used	Compact Flash active **	Compact Flash inactive
☞ *Do not reset the ETU while the HD LED is flashing.*				

7.1.4 Connectors

The ACD(8)-U( ) ETU has the following connectors:

- ✆ J9 — Connects to the backboard
- ✆ 9-pin RS-232(COM1) — Local Serial connector on main ETU for direct connection.

7.1.5 Installation Precautions

The ETUs used in this system make extensive use of CMOS technology that is very susceptible to static electricity. **Static discharge must be avoided** when handling ETUs. Always use the following precautions:

- Wear a grounding strap anytime you handle the ETU.
- Make all ETU DIP switch setting changes before inserting it in the KSU. Ensure that Make Busy switch is Off.
- Carry ETU in a conductive polyethylene bag to prevent static electricity damage.

7.2 BSU(2)-U( ) ETU

7.2.1 Description

The BSU(2)-U( ) ETU provides the connection for Zone Transceivers.

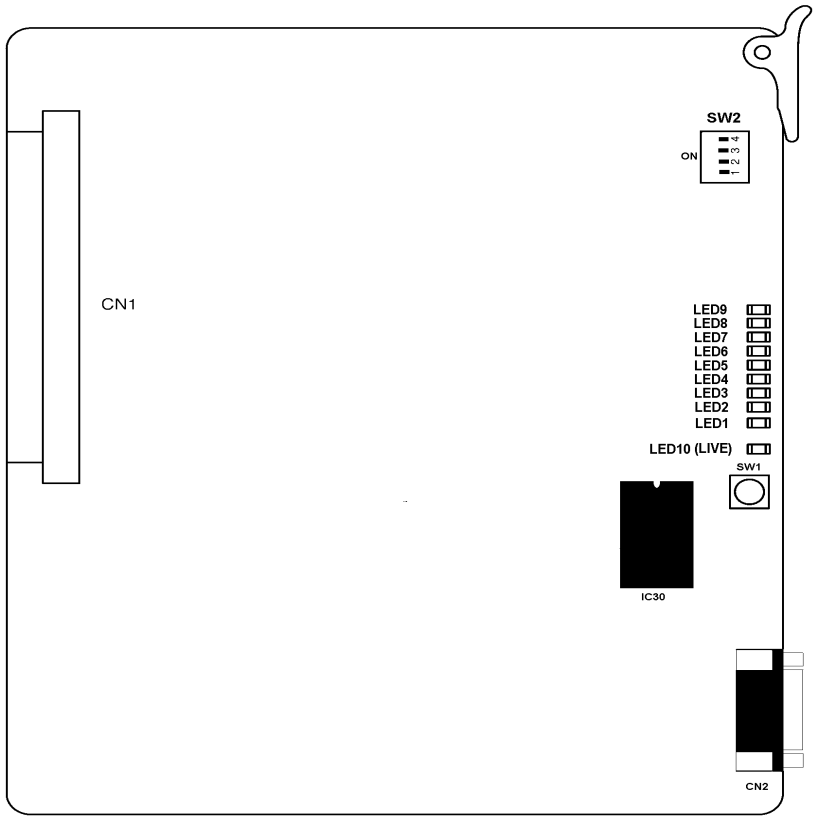


Figure 5-59 BSU(2)-U( ) ETU

7.2.2 Installation

Up to three ETUs can be installed in slots S3~S6 in the system.

7.2.3 Switch Settings

The default switch settings are shown in Table 5-53 BSU(2)-U( ) ETU Default Switch Settings.

Table 5-53 BSU(2)-U( ) ETU Default Switch Settings

SW1		Description
Momentary Switch		BSU ETU Reset

SW2-1	Description
Off	Reports BSU ID to Main S/W (**Master**)
On	Does not report BSU ID to Main S/W (**Slave**)

SW2-2	Description
Off	Boot by Flash memory (**Default**)
On	Boot from EPROM (IC30)

SW2-3	Description
Off	Normal Operation (**Default**)
On	Test Mode

SW2-4	Description
Off	Watch Dog Timer On (**Default**)
On	Watch Dog Timer Off

Pressing SW1 interrupts all Wireless users connected to the BSU(2)-U( )ETU. Use *this switch only as a last resort.*

7.2.4 LED Indications

Table 5-54 BSU(2)-U( ) ETU LED Indications

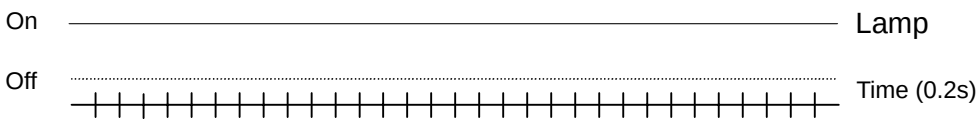
LED	Description	On	Flashing	Off
1	Link Status for ZT1	Layer 1: Up Layer 2: Up	Layer 1: Up Layer 2: Down	Layer 1: Down Layer 2: Down
2	Link Status for ZT2	Layer 1: Up Layer 2: Up	Layer 1: Up Layer 2: Down	Layer 1: Down Layer 2: Down
3	Not used	Always Off		
4				
5	Status for ZT1	Refer to Table 5-55 ZT Status Table for LEDs 5 and 6.		
6	Status for ZT2			
7	Not used	Always Off		
8				
9	BSU Status	Alarm	Normal Operation	Not Operating
10	LIVE	Operation stopped (Power still on)	Normal Operation	No Power

Table 5-55 ZT Status Table for LEDs 5 and 6

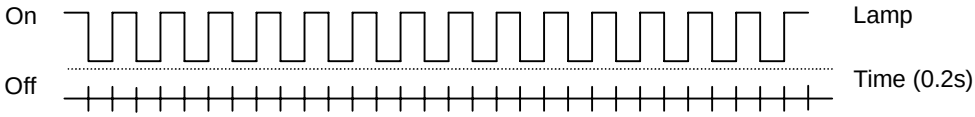
Lamp Off Line is not Connected

Lamp On indications are shown below.

No Flicker (ZT is in standby)

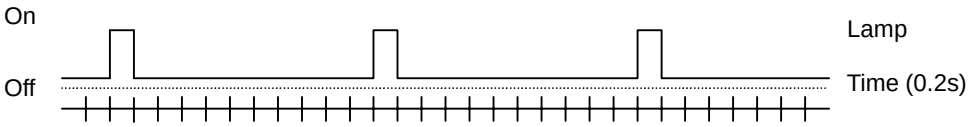


Flash cycle is 0.1 seconds (Not Supported)

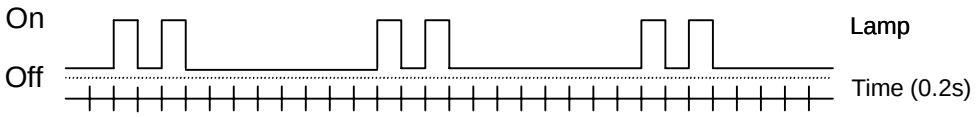


Flash cycle is 0.2 seconds. Remaining indications depend on the number of PS connections.

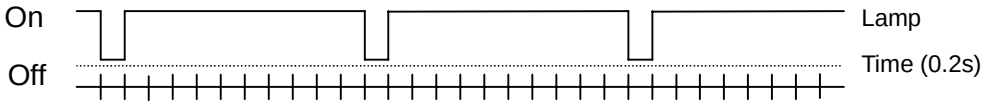
1 PS connection



2 PS connections



3 PS Connections (ZT is busy)



7.2.5 Connectors

The BSU(2)-U( ) ETU has the following connectors:

- CN1 Connects to the backboard
- CN2 For future use

7.2.6 ZT II Connections

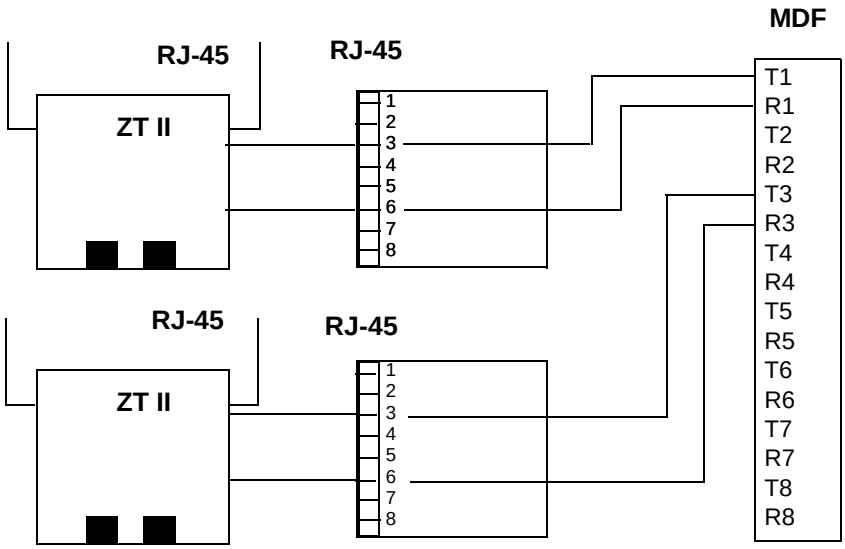


Figure 5-60 BSU(2)-U( ) ETU Connections

7.3 CCH(4)-U( ) ETU

7.3.1 Description

The Common Channel Handler is an optional Interface ETU that provides a common channel signal through the DTI-U30 ETU to a K-CCIS network and controls the signaling between the KTS and the CPU. Each CCH ETU supports four K-CCIS links.

Only one CCH(4)-U( ) ETU can be installed in each system.

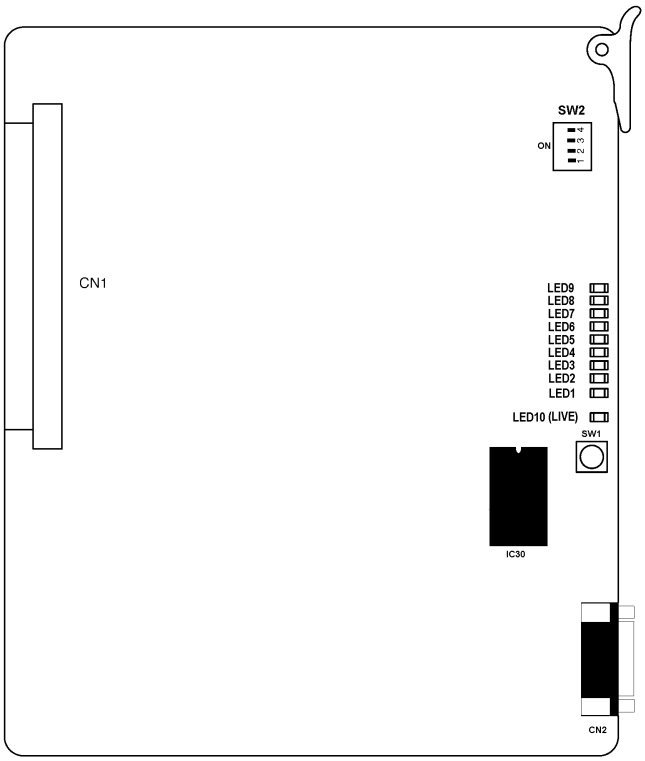


Figure 5-61 CCH(4)-U10 ETU

7.3.2 Installation

The CCH(4)-U( ) ETU can be installed in slots S2~S7 in the Elite 48 KSU. Only one CCH(4)-U( ) ETU can be installed in a system.

7.3.3 Switch Settings

Default switch settings are shown in the following table.

Table 5-56 CCH(4)-U( ) ETU Default Switch Settings

Switch	Setting/Description
SW1	Momentary Switch Resets the CCH ETU. When this switch is pressed, all K-CCIS users connected to the CCH ETU are interrupted. ***Use this switch only after all other options have failed.***
SW2–1	Off: Normal Operation **(Default)** On: Test Mode
SW2–2	Off: Boot from Flash Memory **(Default)** On: Boot from E-PROM (IC30)
SW2–3	Off: Normal Operation **(Default)** On: Test Mode
SW2–4	Off: Watch Dog Timer On **(Default)** On: Watch Dog Timer Off

7.3.4 LED Indications

Table 5-57 CCH(4)-U( ) LED Indications

LED	Description	On	Flashing	Off
1	Link status for CCH1	Layer 2: Up	Not Used	Layer 2: Down
2	Link status for CCH2	Layer 2: Up	Not Used	Layer 2: Down
3	Link status for CCH3	Layer 2: Up	Not Used	Layer 2: Down
4	Link status for CCH4	Layer 2: Up	Not Used	Layer 2: Down
5	Link status for CCH1	Data sent/received	Not Used	Idle
6	Link status for CCH2	Data sent/received	Not Used	Idle
7	Link status for CCH3	Data sent/received	Not Used	Idle
8	Link status for CCH4	Data sent/received	Not Used	Idle
9	CCH status	Alarm	Normal Operation	Not Operating
10 (LIVE)	ETU status	Operation stopped (Power still on)	Normal Operation	No Power

7.3.5 Connectors

The CCH(4)-U( ) ETU has two connectors:

- CN1 Connects to the backboard
- CN2 Performs maintenance functions

7.3.6 Connections

There are no physical connections to the MDF for the CCH ETU.

7.4 ECR-U( ) ETU

7.4.1 Description

The ECR-U( ) ETU provides external relay control for Zone Paging systems (3 relays), External Ringing control relays (4 relays), Night Chime ringing control (1 relay), and two general purpose relays.

There are two audio jacks. One provides the both-way audio-for-paging system. The other provides a tone output for External Tone Ringing and Night Chime.

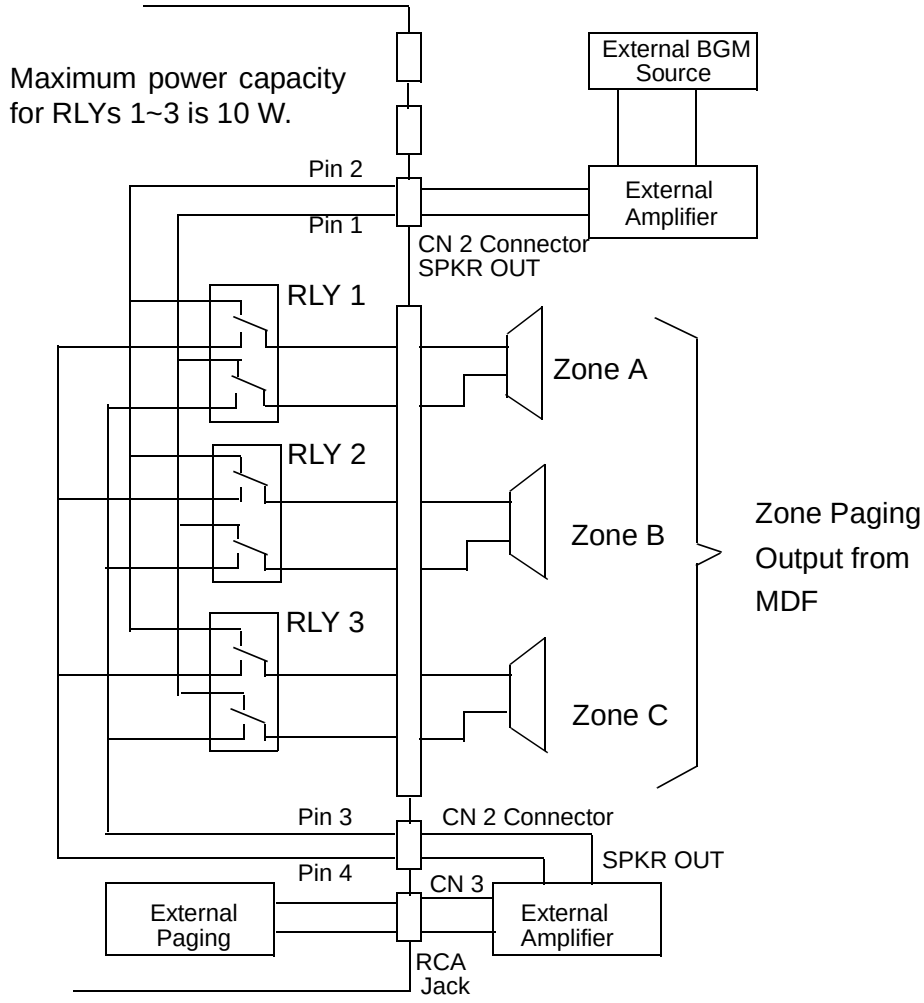


Figure 5-62 ECR-U( ) Block Diagram

7.4.2 Installation

Install only one ECR-U( ) in slots S3~S6.

7.4.3 LED Indications

Live LED indications are listed below.

- Blinking Red — Normal Operation
- Steady Red — Operation Stopped (power on
- Off — No Power

Busy LED indications are listed below.

- Steady Red — Some Relays Busy
- Off — All Relays Idle

7.4.4 Connectors

Refer to Table 5-58 Connector Descriptions (CN2) and Figure 5-63 ECR-U( ) ETU.

- CN1 — Connects to the Backboard
- CN2 — Relay Contacts for Relays 11 and 12
- CN3 — Both-way Audio Connection for External Paging
- CN4 — Audio output for Tone Ringer and Night Chime

Table 5-58 Connector Descriptions (CN2)

Pin Number	Description
13~16	Not Used
12	Relay #1 General Purpose
11	
10	Relay #0 General Purpose
9	
5~8	Not Used
4	Zone Paging Audio Input
3	
2	External Paging BGM input
1	

Refer to Table 4-1 MDF Cable Connections for all other ECR-U( ) cable connections.

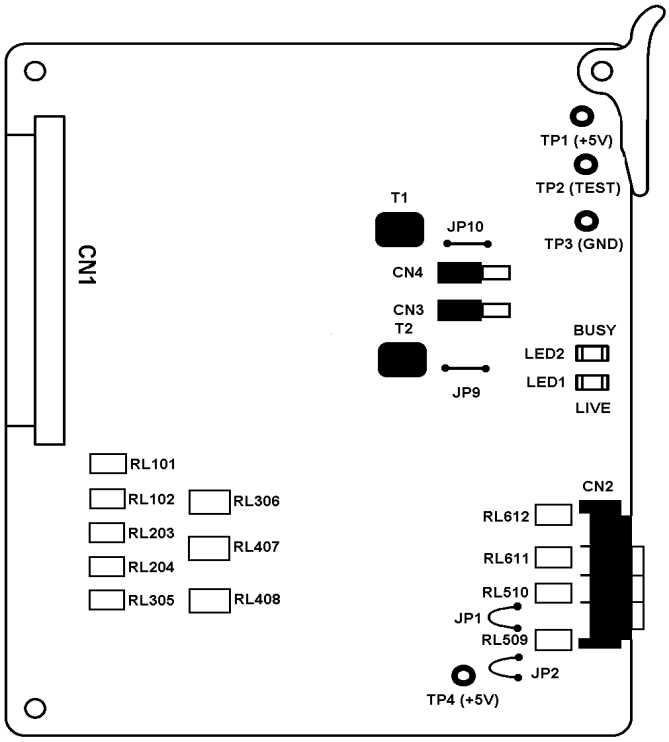


Figure 5-63 ECR-U( ) ETU

7.4.5 Specifications

✆	Relays	All relays are rated 24 Vdc at 500 mA
✆	External Tone	Output Power -10 dBm
✆	Ringer/Night Chime	Output Impedance 600Ω
✆	External Paging	Output power -10 dBm
✆	Output Impedance	600Ω

7.5 HUB(8)-U( ) ETU

7.5.1 Description

The HUB(8)-U( ) ETU is an optional Ethernet interface for the Electra Elite KSU that supports eight Ethernet ports. Each port has two LEDs that indicate status and activity.

A HUB is a switching point for data that comes together from individual ports. A switch determines the port where the data should be forwarded and regulates transmission. The HUB(8)-U( ) ETU provides an efficient platform when multiple ETUs that require Ethernet connection are installed in the Electra Elite KSU. One port can be a source port, and another port can be set as a target port to mirror the source and monitor data traffic.

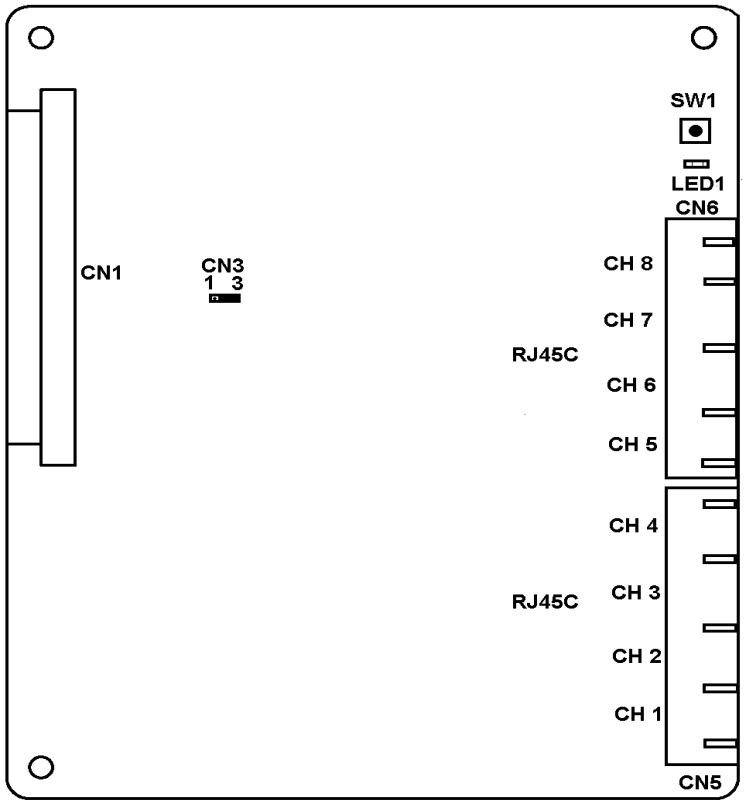


Figure 5-64 HUB(8)-U( ) ETU

7.5.2 Installation

The HUB(8)-U( ) ETU cannot be installed in a KSU that contains EliteMail VP and IVR or CTI and IVR systems.

☞ This ETU has an attached green cable that must be connected to frame ground.

Only one HUB(8)-U( ) ETU can be installed in slots S1~S8.

The system is limited by 32 stations. This ETU shares the total number of station ports in the system.

7.5.3 Switch Settings

Press switch SW1 to Reset the HUB(8)-U( ) ETU.

7.5.4 LED Indications

Refer to Table 5-59 HUB(8)-U( ) LEDS.

Table 5-59 HUB(8)-U( ) LEDS

LED	ON	OFF	Blinking
LED1		No Power to ETU	Normal Operation
RJ45C Yellow	100 Mbps	10 Mbps	N/A
RJ45C Green	LINK	No Link	Data Tx/Rx

7.5.5 Connectors

The HUB(8)-U-( ) ETU the following connectors:

✆ CN1 Connects to the Backboard

✆ CN3 Three pin Jumper. Pins 2 and 3 are shorted for Normal operation

✆ CN5 Channel 1~4 RJ45C Connectors

✆ CN6 Channel 5~8 RJ45C Connectors

7.6 IAD(8)-U( )

7.6.1 Description

The IAD(8)-U( ) ETU is an optional interface integration device ETU for the Electra Elite KSU. The IAD(8)-U( ) ETU supports various IP applications such as the IP CCH ETU application and the MEGACO Station Application. Currently used configurations are indicated in Table 5-60 IAD(8)-U-( ) Configurations.

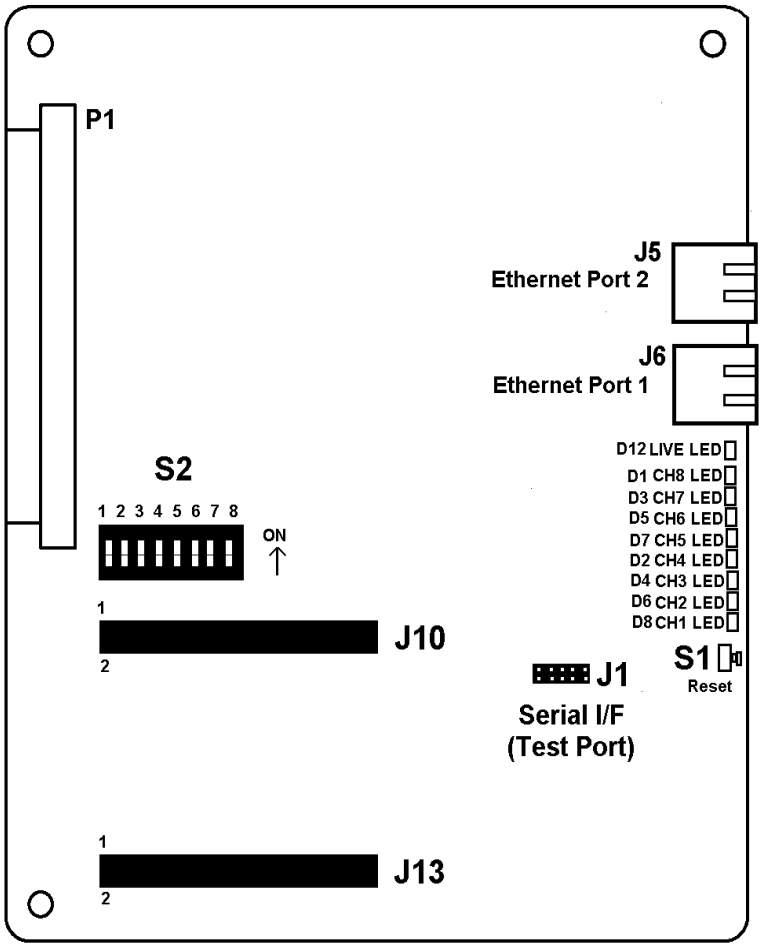


Figure 5-65 IAD(8)-U( ) ETU

Table 5-60 IAD(8)-U-( ) Configurations

Configuration	Ports	Installation slot Electra Elite IPK	Application
DTI(8)-U-U( )	8	S1~S8	IP CCH ETU
ESI(8)-U( )	8	S1~S8	Megaco Station ETU

7.6.2 Boot Up Sequence Status Identification

Status of the IAD(8)-U( ) ETU during boot up is shown in Table 5-61 IAD(8)-U( ) LED Boot Sequence Indications.

Table 5-61 IAD(8)-U( ) LED Boot Sequence Indications

State	D8 CH 1	D6 CH 2	D4 CH 3	D2 CH 4	D7 CH 5	D5 CH 6	D3 CH 7	D1 CH 8	*D12 LIVE	Approximate Time
1	Off	Off	Off	Off	Off	Off	Off	Off	Flash	1 second (from Cold Boot)
2	**ON**	**ON**	**ON**	**ON**	Off	Off	Off	Off	Flash	5 seconds
3	Off	Off	Off	Off	Off	Off	Off	Off	Flash	3 seconds
4	Off	Off	Off	Off	**ON**	**ON**	Off	Off	Flash	5 seconds
5	Off	Off	Off	Off	Off	Off	**ON**	**ON**	Flash	5 seconds
6	Off	Off	Off	Off	Off	Off	Off	Off	Flash	5 seconds

* LIVE LED D12 also flashes when ETU is receiving power from the KSU.

7.6.3 Installation

This ETU can be installed in any KSU slot that supports the applicable ETU simulated.

A maximum of three IAD(8)-U( ) ETUs can be installed in slots S1~S8 when used as an ESI or DTI-U.

7.6.4 Switch Settings

Refer to Table 5-62 IAD(8)-U( ) ETU Switches.

Table 5-62 IAD(8)-U( ) ETU Switches

Switch	Setting	Description
S1	Press to Reset	Host Reset Switch
S2	Shown below	Eight-position DIP Switch
S2-1~3	Always Off	Reserved
S2-4	On (default) to enable Off to disable	Auto Card Discovery Selection - On only for first power on to recognize ETU and set defaults or for ESI(8)-U( ) ETU simulation
S2-5	Always On to enable 8 ports (Off enables 4 ports)	Number of Voice Ports Selection
S2-6~8	S2-6 and S2-7 On for DTI mode. S2-6 On for ESI Mode	IAD(8)-U( ) ETU Mode Selection to show simulated ETU

7.6.5 Ethernet Status

Two Built-in LEDs (One green and one yellow) on the front of each RJ-45 Connector indicate Ethernet connection status. The yellow LED is On when the link is up; the green LED is On to indicate activity.

7.6.6 Connectors

This ETU has the following connectors:

- P1 — Connects to the backboard
- J1, J10, J11 — Reserved for future use
- J5 — RJ-45 Ethernet connector for future use
- J6 — Default RJ-45 Ethernet connector

7.7 IPCA( )-U( ) ETU

7.7.1 Description

The IPCA( )-U( ) ETU is a pure IP switch ETU for use with the Electra Elite KSU. The IPCA( )-U( )ETU can manage call control for a maximum of 30 IP software telephones. The MG(8)-U( ) ETU is required for IP telephones to communicate with existing Electra Elite telephones or various available trunks.

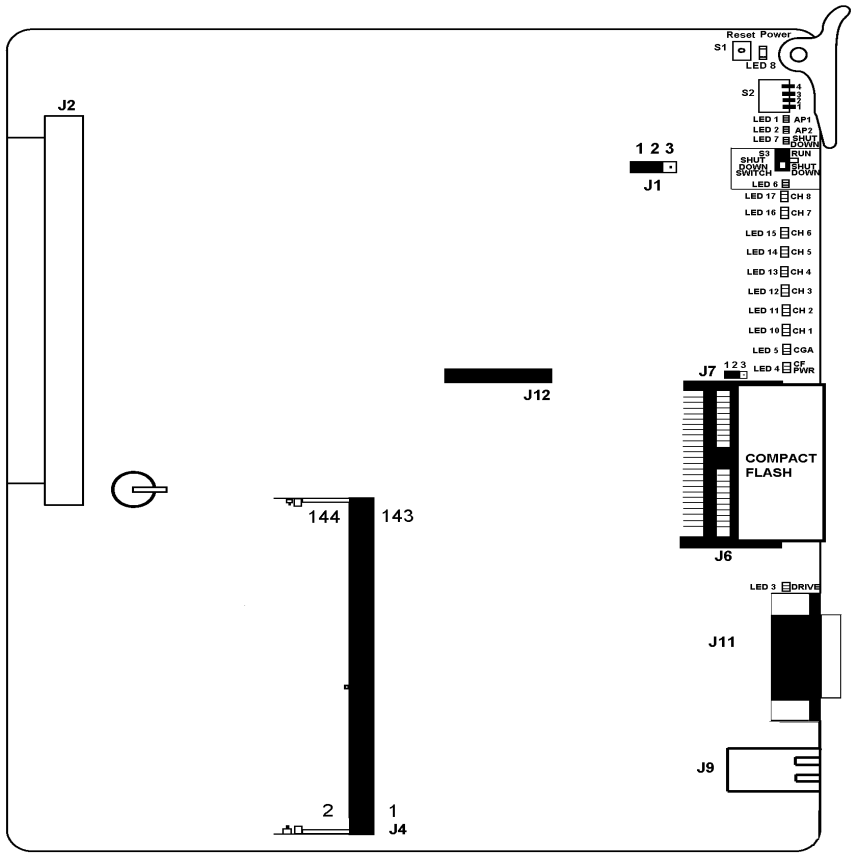


Figure 5-66 IPCA( )-U10

7.7.2 Installation

Only one IPCA( )-U( ) ETU can be installed in slots S1~S8.

The system is limited by 32 stations. This ETU shares the total number of station ports in the system.

When installing this ETU, make all ETU DIP switch setting changes before inserting it in the KSU.

7.7.3 Installation Procedure

1. Ensure that Switch S3 is in SHUTDOWN.
2. Insert IPCA-U( ) ETU in Electra Elite IPK KSU.
3. Connect LAN cable to the LAN.
4. Ensure that Switch S3 is in RUN.
5. Wait for the green AP1 LED to come On.

7.7.4 Shut Down Procedure

1. Ensure that Drive LED is not flashing.
2. Place Switch S3 in SHUTDOWN.
3. Wait for red SHUT DOWN LED to come On.
4. Remove the IPCA-U( ) from the KSU.

7.7.5 Switch Settings

✆ S1

Resets ETU

✆ S2-1

Normal Off. On to set default networking values.

☞ When IP address setting is lost, the IPCA-U( ) can be rebooted with switch S2-1 On to set temporary default networking values:

- IPC IP Address Assignment: 192.168.0.1
- IPC Subnet Mask Assignment: 255.255.255.0
- IPC Router Address Assignment: 0.0.0.0
- DHCP Client Assignment: Disable
- IPC Host Name: mgc

✆ S2-2

Used to enable (ON) or disable (OFF) Log File for troubleshooting.

✆ S2-3/4

Not used.

✆ S3

SHUTDOWN switch used to start or stop the application.

7.7.6 LED Indications

Refer to Table 5-63 IPCA( )-U( )ETU LED Indications.

Table 5-63 IPCA( )-U( )ETU LED Indications

LED	Name	Color	Controller	ON	OFF
1	AP1	Green	AP	Application on Normal	Application stopped (default)
2	AP2	Red	AP	MG ETU registered	MG ETU not registered (default)
3	Drive	Red	BIOS	Accessing drive	Not accessing drive (default)
4	CF PWR	Red		Compact Flash power On	Compact Flash power Off
6	Switch S3 LED	Red	Hardware	Switch S3 in RUN	Switch S3 in SHUT DOWN (default)
7	SHUT DOWN	Red	BIOS	Application shut down – OK to remove ETU	Application Running – Do not remove ETU
10	CH 1	Red	AP	Channel used	Channel not used (default)
11	CH 2	Red	AP	Channel used	Not used (default)
12	CH 3	Red	AP	Channel used	Not used (default)
13	CH 4	Red	AP	Channel used	Not used (default)
14	CH 5	Red	AP	Channel used	Not used (default)
15	CH 6	Red	AP	Channel used	Not used (default)
16	CH 7	Red	AP	Channel used	Not used (default)
17	CH 8	Red	APP	Channel used	Not used (default)

7.7.7 Jumper Settings

- J1 Not Used
- J7 Not Used

7.7.8 Connectors

The IPCA( )-U( ) ETU has the following connectors:

- J2

  Connects to the backplane.

- J4

  Connection for SODimm Memory card.

- J6

  Used for Compact Flash drive on FMS.

- J9

  RJ45 LAN connector used for network connection.

- J11

  Serial Port.

- J12

  Not Used.

7.8 IVR(8)-U( ) ETU

7.8.1 Description

The Electra Elite IVR is an 8-port system that can support IVR applications.

This ETU is a PC platform, installed in the Electra Elite system, that contains hard disk space for voice recorded prompts and script templates.

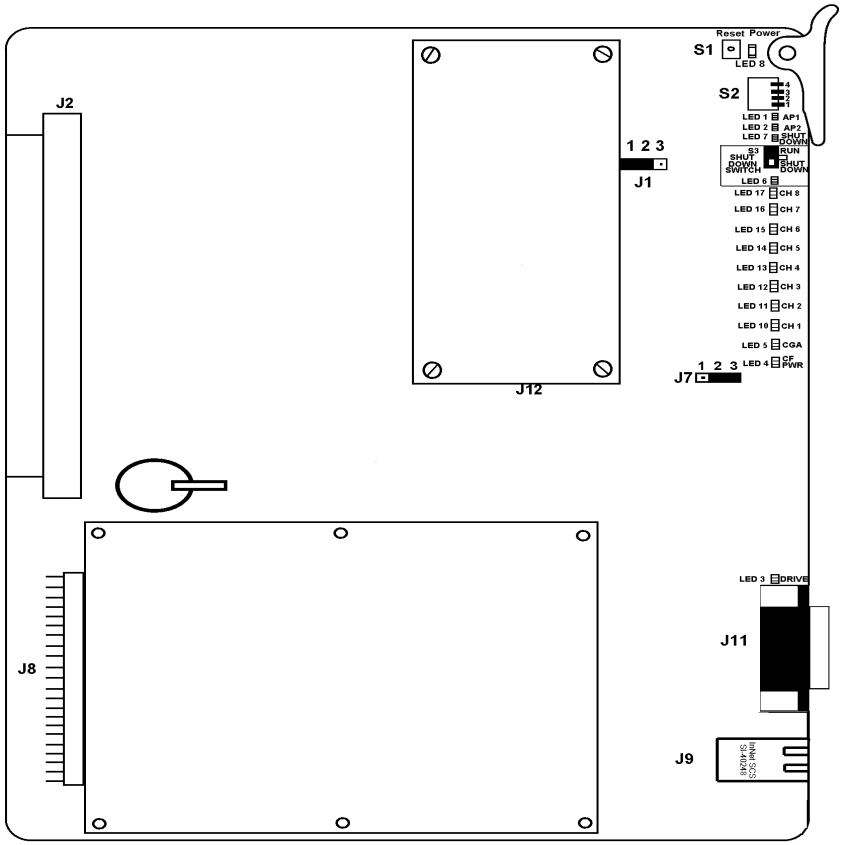


Figure 5-67 IVR(8)-U( ) ETU

7.8.2 Installation

Only one IVR(8)-U( ) ETU can be installed in slots S1~S8.

This ETU shares the total number of station ports in the system. The system is limited by 32 stations.

When installing this ETU, make all ETU DIP switch setting changes before inserting it in the KSU. Ensure that KSU is off.

7.8.3 Switch Settings

Refer to Table 5-64 IVR(8)-U( ) ETU Switch Settings.

Table 5-64 IVR(8)-U( ) ETU Switch Settings

Switch	Default	Description
SW1	Off	Resets the ETU. Leave at factory default setting.
SW2-1	Off	Not used for IVR ETU. Leave at factory default setting.
SW2-2	Off	Restores the ETU to factory default settings when set to ON. Leave at factory default unless factory defaults must be restored, then set SW2-2 and SW2-3 to On.
SW2-3	Off	Restores the ETU to factory default settings when set to ON. Leave at factory default unless factory defaults must be restored, then set SW2-2 and SW2-3 to On.
SW3	ON	Toggles to switch the IVR between Off and On.

7.8.4 LED Indications

Refer to Table 5-65 IVR(8)-U( ) ETU LED Indications

Table 5-65 IVR(8)-U( ) ETU LED Indications

LED	Description	On	Flashing	Off
LED 1, AP1 Application Software	Running without errors Running with errors Not Running	Green Amber Red	Not Used	Not Used
LED 2, AP2	Not Used	Not Used	Not Used	Not Used
LED 3, DRIVE	Hard Drive Access	Red if accessed	Not Used	When not accessed
LED 4, CF PWR	Power to the ETU	Red if power is on	Not Used	No power to ETU
LED 5, ICGA	Live LED	Not Used	Red every 125ms during operation	Operation is shut down
LED 6, Switch S3 Indication	Do not remove Voice Mail from KSU	Red when S3 in RUN	Not Used	S3 not in RUN position
LED 7, SHUT DOWN	Safe to remove Voice Mail from KSU	Red when S3 in SHUT DOWN	Not Used	S3 not in SHUT DOWN position
LED 8, Power	Receiving KSU power	Red if power is on	Not Used	No KSU power
LED 9, FED DSP	For development only	Not Used	Not Used	Not Used
LED 10, CH1	OFF/ON HOOK status	Red for Off-hook	Not Used	On Hook
LED 11, CH2	OFF/ON HOOK status	Red for Off-hook	Not Used	On Hook
LED 12, CH3	OFF/ON HOOK status	Red for Off-hook	Not Used	On Hook
LED 13, CH4	OFF/ON HOOK status	Red for Off-hook	Not Used	On Hook
LED 14, CH5	OFF/ON HOOK status	Red for Off-hook	Not Used	On Hook
LED 15, CH6	OFF/ON HOOK status	Red for Off-hook	Not Used	On Hook
LED 16, CH7	OFF/ON HOOK status	Red for Off-hook	Not Used	On Hook
LED 17, CH8	OFF/ON HOOK status	Red for Off-hook	Not Used	On Hook

The first four channel LEDS are also used during startup to signify:
LED 1 - BICOM driver loaded
LED 2 - Scandisk completed successfully
LED 4 - IVR(8)-U( ) ETU started successfully

After system is up and running these LEDs are turned off, and all channels are ready to receive calls.
When the IVR(8)-U( ) ETU fails to start, all eight channel LEDs and the BCLR LEDs (AP1) are on.

Table 5-66 IVR(8)-U( ) ETU Ready LED Indications shows the status of the IVR(8)-U( ) ETU after it has been installed, initialized and is ready to process calls.

Table 5-66 IVR(8)-U( ) ETU Ready LED Indications

LED	Description	Status
LED 1, AP1 Application Software	Running without errors	Solid Green
LED 4, CF PWR	Power to the ETU	Solid Red
LED 5, ICGA	Live LED	Blinking Red
LED 7, SHUT DOWN	**Initialized application**	Solid Green
LED 8, Power	Receiving KSU power	Solid Red

7.8.5 Jumper Settings

J1	Setting
1 - 2	IVR(8)-U( ) ETU Integration (default)
2 - 3	Not Used

J7	Setting
1 - 2	Not Used
2 - 3	Hard Drive is master drive (default)

7.8.6 Connectors

The IVR(8)-U( ) ETU has the following connectors:

- J2

  Connects to the backplane.

- J8

  Connects to Hard Disk memory.

- J9

  RJ45 LAN connector used for network connection.

- J11

  9-pin RS232 local serial connector used for direct connection.

- J12

  Port expansion connector used for DSP-U30.

7.9 MG(8)-U( ) ETU

7.9.1 Description

The MG(8)-U( ) ETU is an eight-path gateway ETU between the IPCA( )-U10 and the MBD-U10).

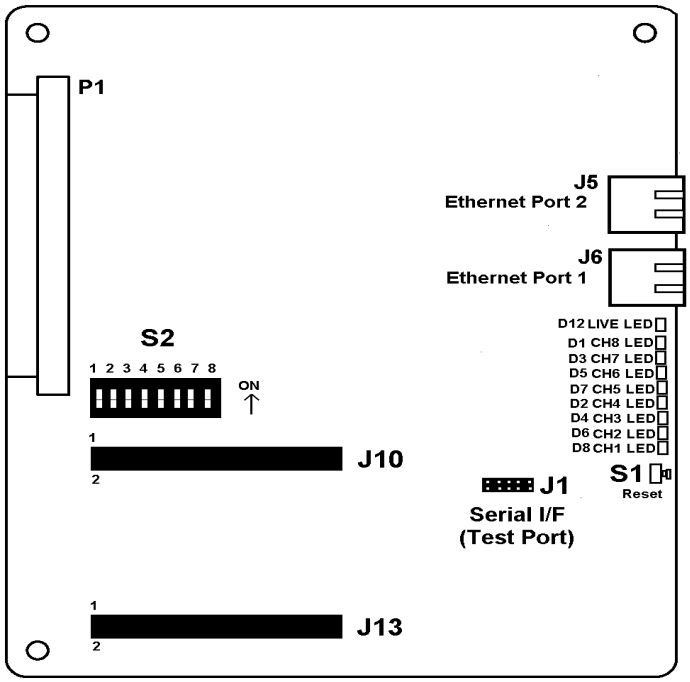


Figure 5-68 MG(8)-U( ) ETU

7.9.2 Installation

Only one MG(8)-U( )ETU can be installed in slots S1~S8.

The system is limited by 32 stations. This ETU shares the total number of station ports in the system.

7.9.3 Switch Settings

- S1

  Reset Switch

- S2

  Eight position DIP switch. Refer to Table 5-67 MG(8)-U( ) ETU S2 Switch Settings.

Table 5-67 MG(8)-U( ) ETU S2 Switch Settings

S2	Description	Default
1	ETU Type Selection. Refer to Table 5-68 ETU Common Settings for the IAD platform.	
2		
3		
4	Four/eight channel Assignment: On: 8 channel, Off: 4 channel	On
5	On to Enable 1st Power On.	On
6	Default IP Address Setting On/Off	Off
☞ When MG(8)-U10 ETU is booted with Switch 6 On, the following defaults are set: - MG IP Address Assignment: 192.168.0.2 - MG Subnet Mask Assignment: 255.255.255.0 - MG Router Address Assignment: 0.0.0.0 - DHCP Client Assignment: Disable		
7	On to output Log data for system communications. Used for troubleshooting.	Off
8	On to output Log data for MEGACO. Used for troubleshooting.	Off

Table 5-68 ETU Common Settings for the IAD platform

ETU Type	Switch 1	Switch 2	Switch 3
COI	On	On	On
COID	On	On	Off
DID	On	Off	On
TLI	On	Off	Off
DTI	Off	On	On
MG	Off	On	Off
ESI	Off	Off	On
Not Used	Off	Off	Off

7.9.4 LED Indications

7.9.4.1 Normal State

Refer to Table 5-69 Normal State LEDs.

Table 5-69 Normal State LEDs

LED	ON	FLASHING	OFF
Channel LEDs 1~8 Status	Busy		Idle
Live Led	Operation Stopped Power On	Normal Operation	Power Off

7.9.4.2 For Initialization

Refer to Table 5-70 Initialization LEDs.

Table 5-70 Initialization LEDs

Condition	LED 1	LED 2	LED 3	LED 4	LED 5	LED 6	LED 7	LED 8
Power On	On	On	On	On	On	On	On	On
Searching IPCA( )-U10	On	Off	On	Off	On	Off	On	Off
Initialized	Off	Off	Off	Off	Off	Off	Off	Off

7.9.5 Connectors

The MG(8)-U( ) ETU has the following connectors:

- P1 Connects to the backplane
- J1 Serial Interface Test Port
- J5 Ethernet Port 2 (Not Used)
- J6 Ethernet Port 1 Connects to LAN
- J10 Not used
- J13 Not used

7.10 PBR( )-U( ) ETU

7.10.1 Description

The Pushbutton Receiver (PBR) ETU detects and translates DTMF tones generated by Single Line Telephones, modems, or facsimile machines. This ETU is required if the four built-in MBD-U10 Unit PBR channels are not enough to support all the PBR requirements of the system, or the MBD-U10 Unit PBRs are dedicated to the VRS(4)-U10 ETU.

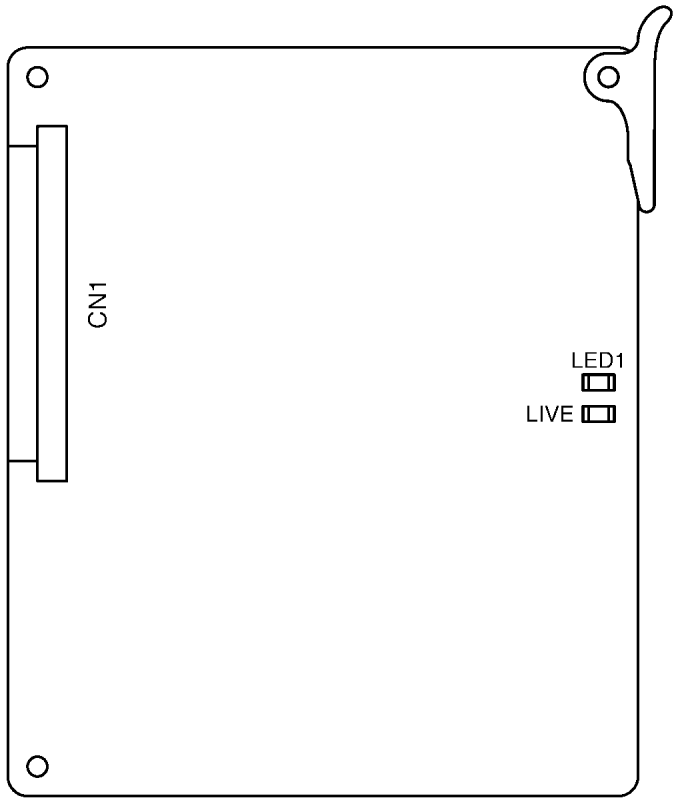


Figure 5-69 PBR( )-U( ) ETU

7.10.2 Installation

Only one PBR( )-U( ) ETU can be installed in slots S2~S7 to provide four PBR circuits. Four circuits are built-in for a total of eight PBR circuits.

7.10.3 LED Indications

Live LED indications are listed below.

✆	Blinking Red	Normal Operation
✆	Steady Red	Operation Stopped (power on)
✆	Off	No Power

LED 1 indications are listed below.

✆	On	Some circuit(s) receiving DTMF signaling
✆	Off	All PBR(s) idle

7.10.4 Connectors

The PBR( )-U( ) ETU has one connector:

✆	CN1	Connects to the backboard

7.11 VRS(4)-U( ) ETU

7.11.1 Description

The Voice Recording Service ETU provides record/playback of voice messages for the Automated Attendant, Voice Prompt, and Delay Announcement features. The VRS(4)-U( ) ETU must use the built-in PBR circuits on the MBD-U10 Unit for Automated Attendant or DISA.

Each VRS(4)-U( ) ETU has four record/playback channels. The maximum voice recording time for each channel is 240 seconds. The technician can select one of four message lengths. The available message lengths and the maximum number of messages that can be recorded are listed in the following table.

Message Length	Maximum Number of Recorded Messages
15 seconds	16
30 seconds	8
60 seconds	4
120 seconds	2

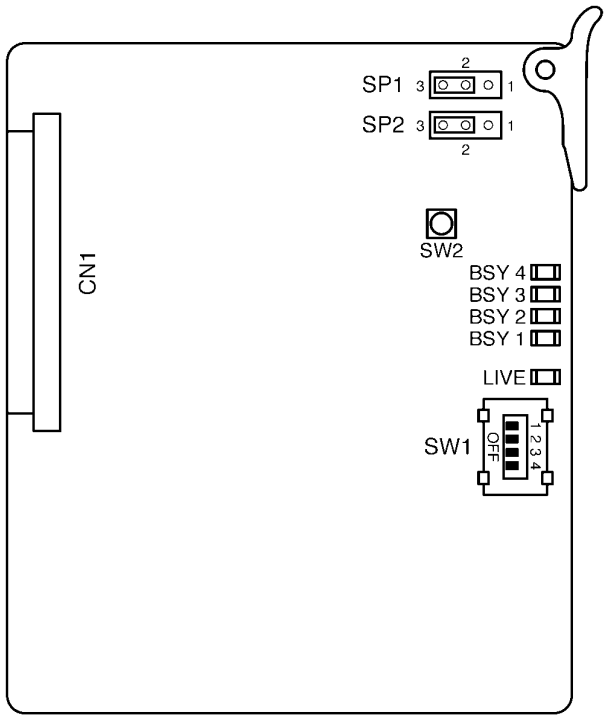


Figure 5-70 VRS(4)-U( ) ETU

7.11.2 Installation

Two VRS(4)-U10 ETUs can be installed in slots S2~S7.

7.11.3 Switch Settings

Refer to Table 5-71 VRS(4)-U( ) ETU Default Switch Settings.

Table 5-71 VRS(4)-U( ) ETU Default Switch Settings

Switch Settings			Function
SW1–1	**SW1–2**	**SW1–3**	Recording decibel adjustment
Off	Off	Off	0 decibels (default)
On	Off	Off	1 decibel
Off	On	Off	2 decibels
On	On	Off	3 decibels
Off	Off	On	4 decibels
On	Off	On	5 decibels
Off	On	On	6 decibels
On	On	On	7 decibels

SW1-4	On	Record Gain
	Off	Record Pad (default)

SW2	N/A	Test/Reset Switch

7.11.4 LED Indications

Table 5-72 VRS(4) LED Indications

LED	Description	On	Flashing	Off
BSY 1	Channel 1 status	Busy	Not Used	Idle
BSY 2	Channel 2 status	Busy	Not Used	Idle
BSY 3	Channel 3 status	Busy	Not Used	Idle
BSY 4	Channel 4 status	Busy	Not Used	Idle
LIVE	ETU status	Operation stopped (Power On)	Normal operation	No Power

7.11.5 Connectors

The VRS(4)-U( ) ETU has one connector:

✆ CN1 Connects to the backboard

7.11.6 Pins

Two pins, **SP1** and **SP2**, are located on the top right of the VRS ETU. These short pins are for maintenance. ***Do not*** change the factory default settings on these pins. Pins 2 and 3 are short-circuited.

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Installing Electra Elite Multiline Terminals

CHAPTER 6

SECTION 1 GENERAL INFORMATION

The Electra Elite 48 system provides several different Multiline Terminals, an Attendant Console, and several adapters that allow peripheral equipment to be attached to the Multiline Terminals. With the exception of the VDD-U Unit, the adapters can also be used with D^{term} Series E Multiline Terminals. This chapter describes each terminal, console, and adapter and provides applicable installation instructions.

SECTION 2 MULTILINE TERMINALS

2.1 DTP-2DT-1 TEL

This digital Multiline Terminal has two programmable line keys (each with a 2-color LED), eight function keys, a built-in speakerphone, headset connection, and a Large LED to indicate incoming calls and messages.

Optional adapters cannot be installed in this terminal.

A maximum of 31 DTP-2DT-1 TELs can be installed in the Electra Elite 48 system.

Figure 6-1 DTP-2DT-1 TEL Multiline Terminal

2.2 DTU-8-1 TEL

This digital nondisplay Multiline Terminal has eight programmable line keys (each with a 2-color LED), eight function keys, a built-in speakerphone, headset jack, a large LED to indicate incoming calls and messages, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C)-U, CTU(S)-U, HFU-U, or VDD-U Unit.

The DTP-8-1 TEL can also be used with the Electra Elite 48 system.

A maximum of 31 DTU/DTP-8-1 terminals can be installed in the Electra Elite 48 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in an Electra Elite 48 system is 32.

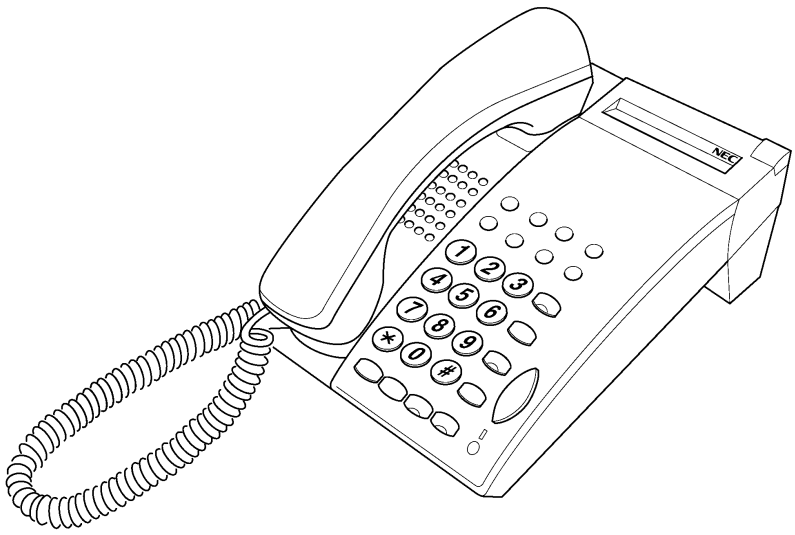

Figure 6-2 DTU-8-1 TEL Multiline Terminal

2.3 DTU-8D-2 TEL

This digital Multiline Terminal has eight programmable line keys (each with the 2-color LED), eight function keys, a built-in speakerphone, headset jack, a Large LED to indicate incoming calls and messages, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C)-U, CTU(S)-U, HFU-U, or VDD-U Unit.

This terminal also has a 3-line, 24-character, adjustable Liquid Crystal Display (LCD) and four softkeys.

The DTP-8D-1 TEL can also be used with the Electra Elite 48 system.

A maximum of 32 DTU-8D-2/DTP-8D-1 terminals can be installed in the Electra Elite 48 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in the Electra Elite 48 system is 32.

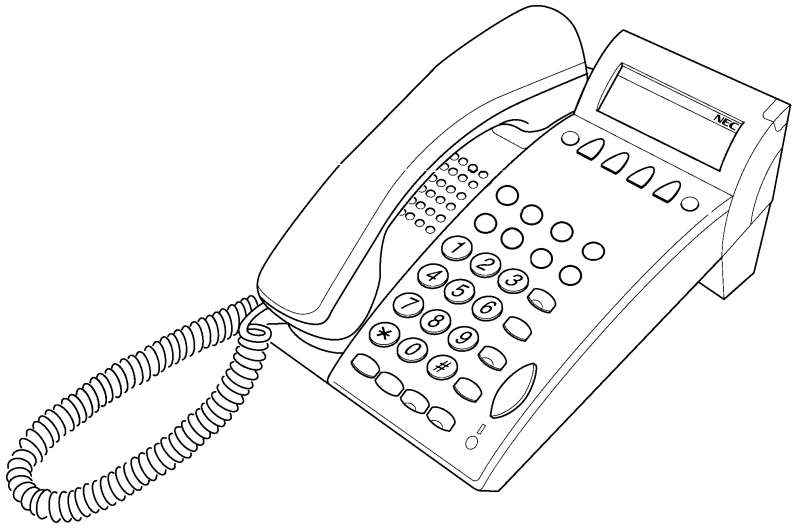

Figure 6-3 DTU-8D-2 TEL Multiline Terminal

2.4 DTU-16-1 TEL

This digital nondisplay Multiline Terminal has 16 programmable line keys (each with a 2-color LED), eight function keys, a built-in speakerphone, headset jack, a large LED to indicate incoming calls and messages, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C)-U, CTU(S)-U, HFU-U, or VDD-U Unit.

The DTP-16-1 TEL can also be used with the Electra Elite 48 system.

A maximum of 31 DTU/DTP-16-1 terminals can be installed in an Electra Elite 48 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in an Electra Elite 48 system is 32.

Figure 6-4 DTU-16-1 TEL Multiline Terminal

2.5 DTU-16D-2 TEL

This digital Multiline Terminal has 16 programmable line keys (each with a 2-color LED), eight function keys, a built-in speakerphone, headset jack, a large LED to indicate incoming calls and messages, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C)-U, CTU(S)-U, HFU-U, or VDD-U Unit.

The DTP-16D-1 TEL can also be used with the Electra Elite 48 system.

This terminal also has a 3-line, 24-character, adjustable Liquid Crystal Display (LCD) and four softkeys.

A maximum of 32 DTU-16D-2/DTP-16D-1 terminals can be installed in an Electra Elite 48 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in an Electra Elite 48 system is 32.

Figure 6-5 DTU-16D-2 TEL Multiline Terminal

2.6 DTU-32-1 TEL

This digital nondisplay Multiline Terminal has 16 programmable line keys (each with a 2-color LED), 16 one-touch keys, eight function keys, a built-in speakerphone, headset jack, a large LED to indicate incoming calls and messages, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C)-U, CTU(S)-U, HFU-U, or VDD-U Unit.

System software can be changed so this Multiline Terminal can have 24 programmable line keys and eight one-touch keys.

The DTP-32-1 TEL can also be used with the Electra Elite 48 system.

A maximum of 31 DTU/DTP-32-1 terminals can be installed in an Electra Elite 48 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in an Electra Elite 48 system is 32.

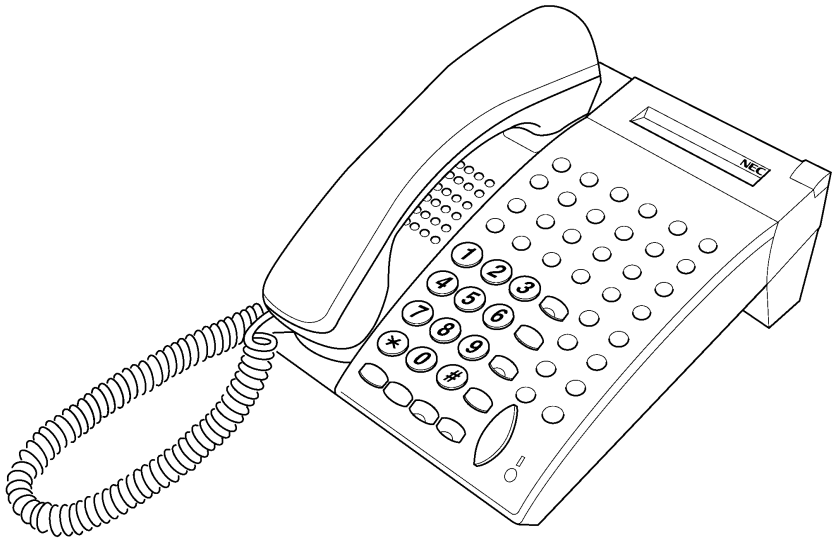

Figure 6-6 DTU-32-1 TEL Multiline Terminal

2.7 DTU-32D-2 TEL

This digital Multiline Terminal has 16 programmable line keys (each with a 2-color LED), 16 one-touch keys, eight function keys, a built-in speakerphone, headset jack, a large LED to indicate incoming calls and messages, and compatibility with ADA-U, APA-U, APR-U, CTA-U, CTU(C)-U, CTU(S)-U, HFU-U, or VDD-U Unit.

This terminal is also equipped with a 3-line, 24-character, adjustable Liquid Crystal Display (LCD) and four softkeys.

System software can be changed so this Multiline Terminal can have 24 programmable line keys and eight one-touch keys.

The DTP-32D-1 TEL can also be used with the Electra Elite 48 system.

A maximum of 32 DTU-32D-2/DTP-32D-1 terminals can be installed in an Electra Elite 48 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in an Electra Elite 48 system is 32.

Figure 6-7 DTU-32D-2 TEL Multiline Terminal

2.8 DCU-60-1 CONSOLE

The Attendant Console has 60 programmable line keys (each with a 2-color LED) that can be programmed as Direct Station Selection keys, function keys, or as outside line keys. An external power supply (AC adapter) is provided with the Attendant Console.

A maximum of four DCU-60-1 Consoles can be installed in an Electra Elite 48 system. An Attendant Position can have four DCU-60-1 Consoles associated with it.

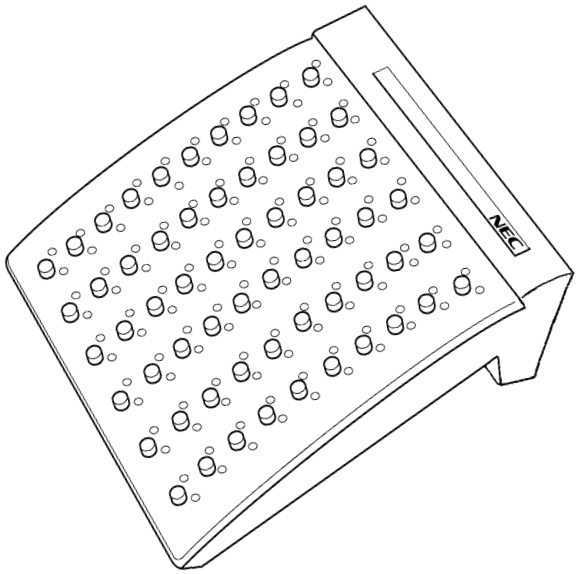

Figure 6-8 DCU-60-1 Console

SECTION 3
SINGLE LINE TELEPHONES

3.1 DTP-1-1 or DTP-1-2 TEL

The Single Line Telephone is a fully modular terminal with a Flash key, redial key, 3-level receive volume control, 2-level ring volume control, data jack, and message waiting lamp. Each terminal requires an SLT(1)-U( ) ADP or SLI(4)/(8)-U( ) ETU.

A maximum of 24 DTP-1-1 or DTP-1-2 TELs can be installed in an Electra Elite 48 system.

Figure 6-9 DTP-1-1 TEL Single Line Telephone

☞ The H switch setting for the receive volume control should only be used by hearing impaired individuals, otherwise hearing damage may occur. This telephone complies with HAC (Hearing Aid Compatible) volume control defined by section 68.317 of the FCC Rules and Regulations, 1996 edition.

☞ The H switch setting for the receive volume control should only be used by hearing impaired individuals, otherwise hearing damage may occur. This telephone complies with HAC (Hearing Aid Compatible) volume control defined by section 68.317 of the FCC Rules and Regulations, 1996 edition.

3.2 DTP-1HM-1 or DTP-1HM-2 TEL

The Single Line Telephone is a fully modular terminal with a flash key, redial key, 3-level receive volume control, 2-level ring volume control, data jack, message waiting lamp, and eight programmable Feature Access/Speed Dial keys. Each terminal requires an SLT(1)-U( ) ADP or SLI(4)/(8)-U( ) ETU.

A maximum of 24 DTP-1HM-1 or DTP-1HM-2 TELs can be installed in an Electra Elite 48 system.

Figure 6-10 DTP-1HM-1(WH) TEL Single Line Telephone

☞ The H switch setting for the receive volume control should only be used by hearing impaired individuals, otherwise hearing damage may occur. This telephone complies with HAC (Hearing Aid Compatible) volume control defined by section 68.317 of the FCC Rules and Regulations, 1996 edition.

☞ The H switch setting for the receive volume control should only be used by hearing impaired individuals, otherwise hearing damage may occur. This telephone complies with HAC (Hearing Aid Compatible) volume control defined by section 68.317 of the FCC Rules and Regulations, 1996 edition.

SECTION 4
CONNECTING A DTU/ DTP TERMINAL TO THE SYSTEM

These instructions for connecting a Multiline Terminal to the system apply to all of the Electra Elite Multiline Terminals.

1. Plug the telephone cord in the modular jack on the bottom side of the Multiline Terminal. The handset is also attached to the bottom side of the Multiline Terminal.

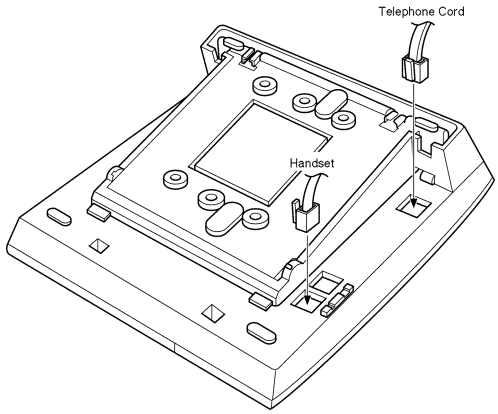

Figure 6-11 Connecting a Multiline Terminal to the System

2. Lead the telephone and handset cords through the appropriate grooves.

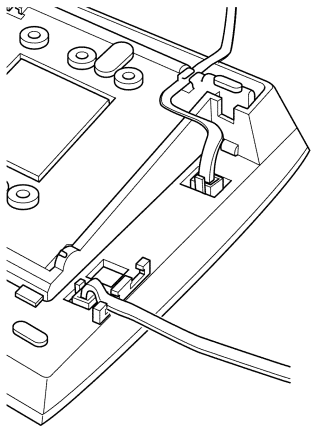

Figure 6-12 Leading Line Cords on a Multiline Terminal

SECTION 5 CONNECTING DCU ATTENDANT CONSOLE TO A MULTILINE TERMINAL

An Attendant Console can be attached to a Multiline Terminal using the following procedures.

1. Turn the Multiline Terminal and the Attendant Console face down.

2. Using the joining plate provided with the Attendant Console, attach the plate to the Multiline Terminal and the Attendant Console.

3. Connect the line cord and the AC adapter to the indicated locations on the bottom of the Attendant Console.

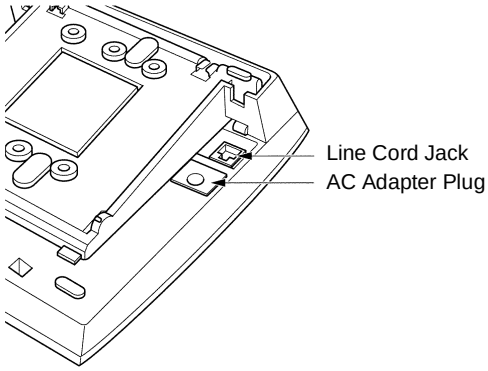

Figure 6-13 Connecting the Line Cord and AC Adapter when Installing a DCU Attendant Console

4. When the Attendant Console and the Multiline Terminal are properly connected, they sit side-by-side as shown in Figure 6-14 DCU Attendant Console and Multiline Terminal.

   Ensure that the AC adapter, supplied with the Attendant Console, is used. Using a different AC adapter may cause problems. Check that the supplied voltage matches that of the adapter and plug it in an outlet.

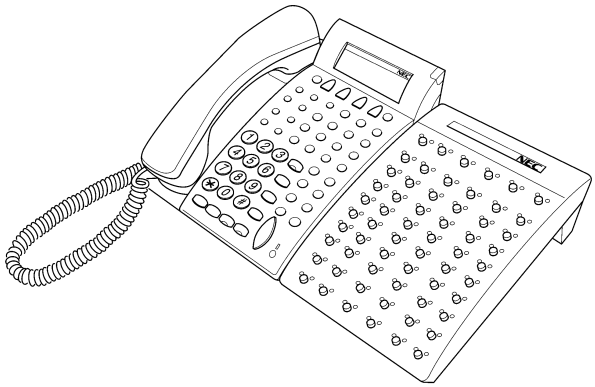

Figure 6-14 DCU Attendant Console and Multiline Terminal

SECTION 6
ADJUSTING THE DTU/ DTP LCD

Electra Elite display Multiline Terminals have an adjustable Liquid Crystal Display (LCD). The LCD can be adjusted by pushing downward or upward as desired.

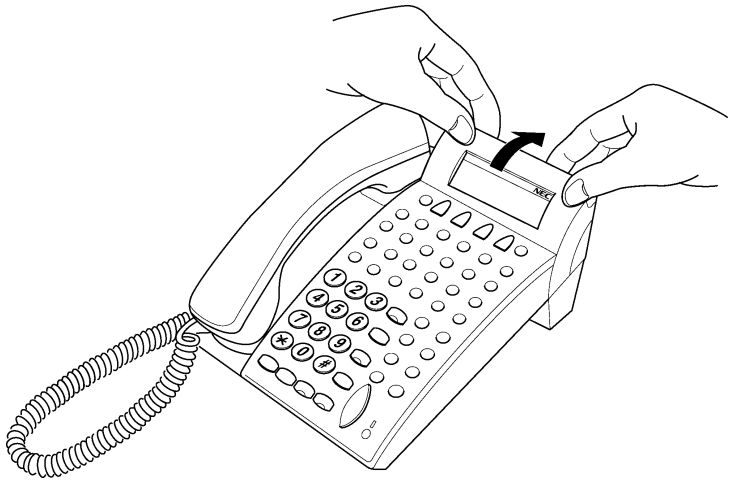

Figure 6-15 Adjusting the DTU/DTP LCD

SECTION 7 INSTALLING DTU/DTP LINE CARDS AND PLASTIC PANELS

7.1 Line Card and Plastic Panel Installation

Line key designations are entered on the Line Card that is then placed on the Multiline Terminal to provide a quick reference of key designations. The Line Card can be changed as necessary. The Plastic Panel is placed on top of the Line Card to hold it in place.

1. Place the Line Card over the keys on the Multiline Terminal.

2. Place the tabs on the bottom of the plastic panel in the grooves at the terminal bottom, and press top right and left ends to secure plastic panel to the Multiline Terminal. Refer to Figure 6-16 Installing Line Card and Plastic Panel on DTU/DTP Multiline Terminal.

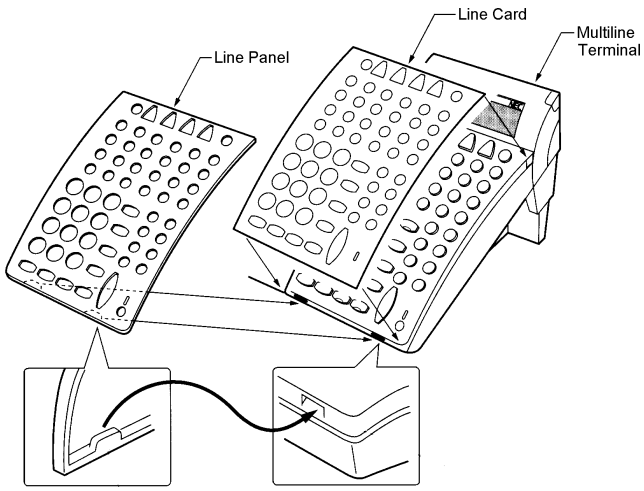

Figure 6-16 Installing Line Card and Plastic Panel on DTU/DTP Multiline Terminal

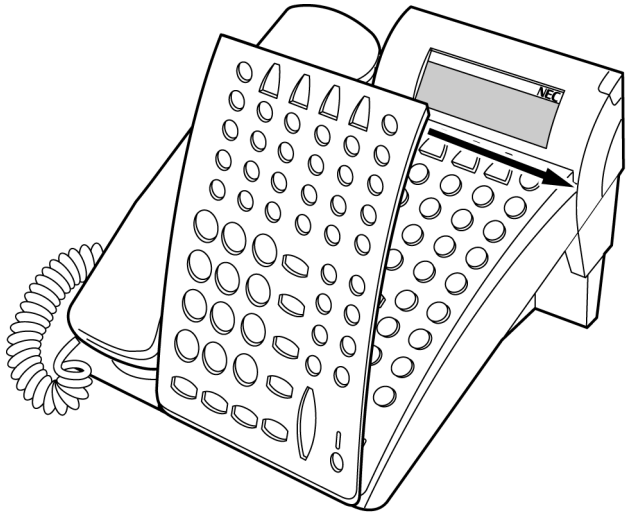

Figure 6-17 Installing Plastic Panel on a DTU/DTP Multiline Terminal

7.2 Plastic Panel Removal

Lift the right corner, raise the panel, and slide the bottom away from the Multiline Terminal.

Never pull the bottom of the pastic panel to remove it; the plastic panel could be damaged.

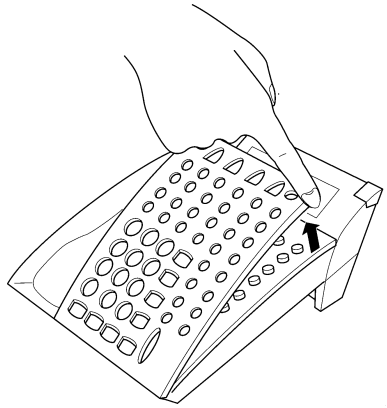

Figure 6-18 Removing the Plastic Panel from the Multiline Terminal

3. Install the plastic panel again.

SECTION 8
REMOVING DTU/DTP SOFTKEYS

When softkeys are not used on the Multiline Terminal, remove them as follows:

1. Pull the softkey plate upward as shown in Figure 6-19 Removing DTU/DTP Softkeys.

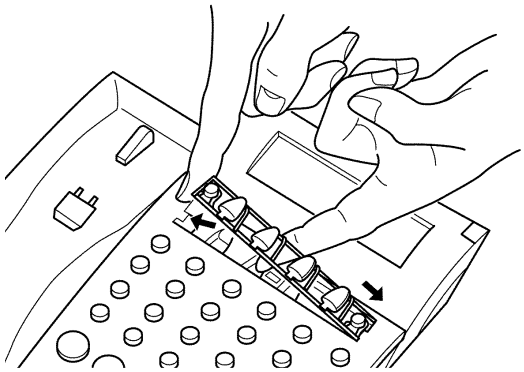

Figure 6-19 Removing DTU/DTP Softkeys

2. Install the plastic panel again.

SECTION 9
ADJUSTING DTU/DTP MULTILINE TERMINAL HEIGHT

The base plate on Electra Elite Multiline Terminals is hinged. The bottom part can be adjusted to raise or lower the height of the terminal.

1. Turn the Multiline Terminal upside down and locate the tabs as shown in Figure 6-20 Locating the Adjustment Tabs on the DTU/DTP Multiline Terminal.

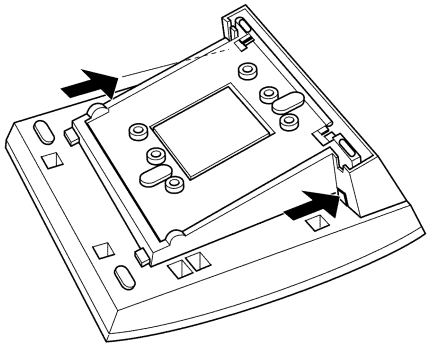

Figure 6-20 Locating the Adjustment Tabs on the DTU/DTP Multiline Terminal

2. Push the adjustment tabs and raise the base plate until it locks.

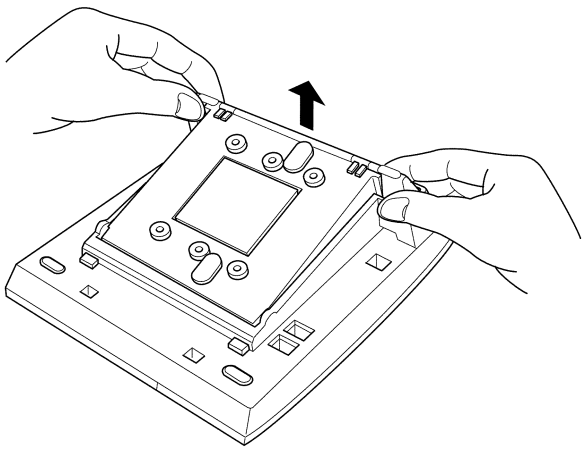

Figure 6-21 Raising the Base Plate on the DTU/DTP Multiline Terminal

3. The length of the cord can be adjusted by pulling the line cord though the groove in the bottom of the Multiline Terminal.

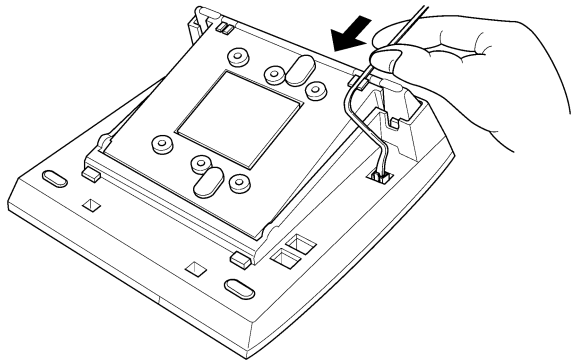

Figure 6-22 Adjusting the DTU/DTP Line Cord Length

4. To lower the base plate on the Multiline Terminal, push on the adjustment tabs and push the base plate downward.

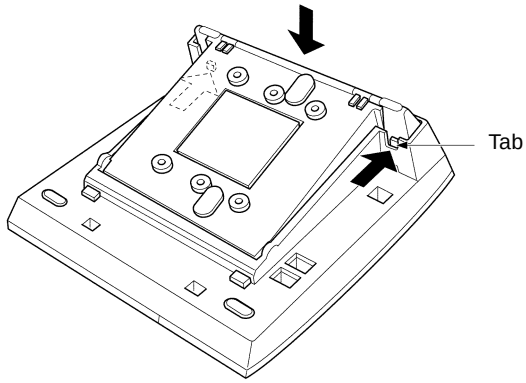

Figure 6-23 Lowering the Base Plate on the DTU/DTP Multiline Terminal

SECTION 10
INSTALLING A D^term® CORDLESS LITE OR D^term® CORDLESS II TERMINAL

10.1 Selecting an Installation Location

Select a location to avoid excessive heat or humidity. The base unit should be placed on a desk or tabletop near a standard 120 Vac outlet and within reach of the telephone line connection on the Electra Elite Multiline Terminal. Keep the base unit and the handset away from sources of electrical noise (*e.g.* fluorescent lighting).

Depending on your environment, the maximum number of cordless devices used without interference varies.

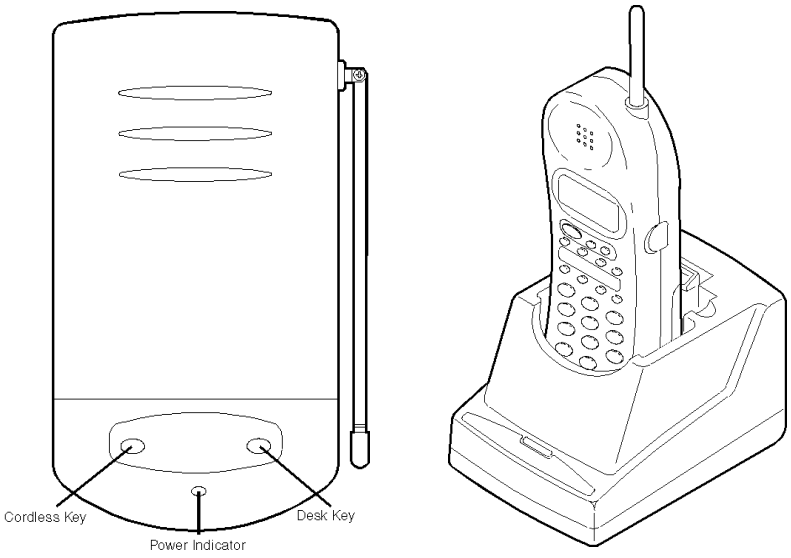

Figure 6-24 D^term Cordless Lite Terminal

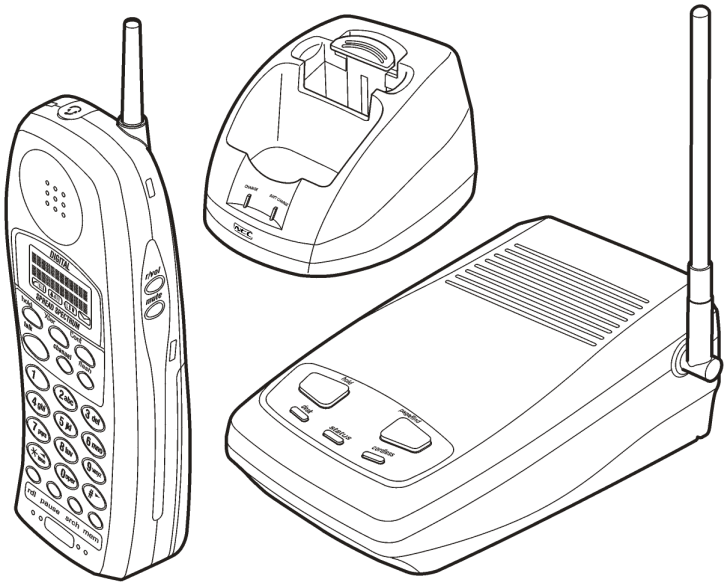

Figure 6-25 D^{term} Cordless II

10.2 Connecting the Telephone Cords

The D^{term} Cordless Lite or Cordless II terminal is connected to the telephone line and to the host telephone using two telephone line jacks on the back of the Base Unit: LINE IN and LINE OUT.

Observe the following warnings during installation.

- Never install telephone wiring during a lightning storm.
- Never touch uninsulated telephone wires or terminals unless the line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.

1. Unplug the telephone line cord from the host telephone, and connect it to the LINE IN jack.
2. Using the telephone line cord supplied with the D^{term} Cordless or Cordless II Terminal, connect the LINE OUT jack to the host telephone jack.

10.3 Applying Power to the Base Unit

1. Plug the AC Adapter cord into the AC Adapter input jack on the Base Unit.

   ☞ Use only the AC Adapter supplied with the D^{term} Cordless or Cordless II Terminal.

2. Plug the AC Adapter into a standard 120 Vac wall outlet.

3. Route the power cord where it does not create a trip hazard or where it could become chafed and create a fire or other electrical hazards.

   ☞ The AC Adapter furnished with this phone should be equipped with a polarized line plug (a plug having one blade wider than the other). This plug fits into the power outlet only one way. When you cannot insert the plug fully into the outlet, reverse the plug. When the plug still does not fit, contact your facilities coordinator about replacing the obsolete plug. Do not alter the shape of the blades of the polarized plug.

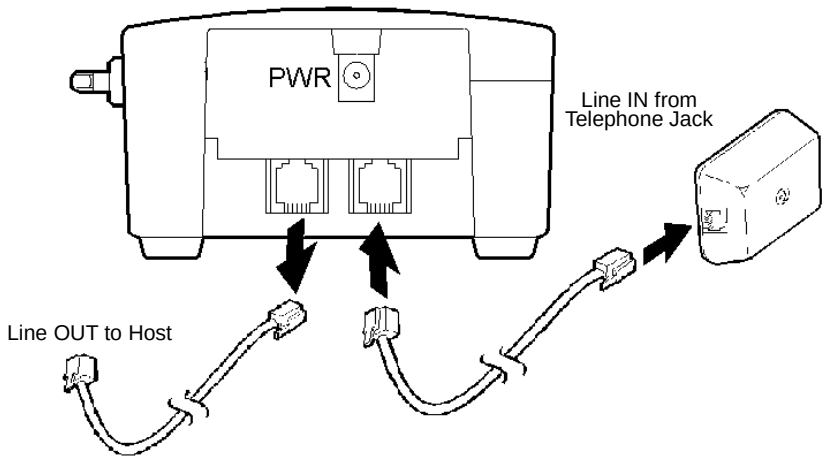

Figure 6-26 Connecting the Base Unit

SECTION 11
INSTALLING D^term® HANDSET CORDLESS TERMINAL

11.1 Selecting an Installation Location

Select a location for the DTP-16HC-1 TEL to avoid excessive heat or humidity. The base unit should be placed on a desk or tabletop near a standard 120 Vac outlet and within reach of the telephone line connection on the Electra Elite Multiline Terminal. Keep the base unit and the handset away from sources of electrical noise (*e.g.*, fluorescent lighting).

Depending on your environment, the maximum number of cordless devices used without interference varies.

11.2 Connecting the Telephone Cord

The Base Unit of the DTP-16HC-1 Tel has two jacks on the back: LINE and DC24V.

Observe the following warnings during installation.

- ✆ Never install telephone wiring during a lightning storm.
- ✆ Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- ✆ Use caution when installing or modifying telephone lines.

Using the telephone line cord supplied with the terminal, connect the LINE jack to the telephone line.

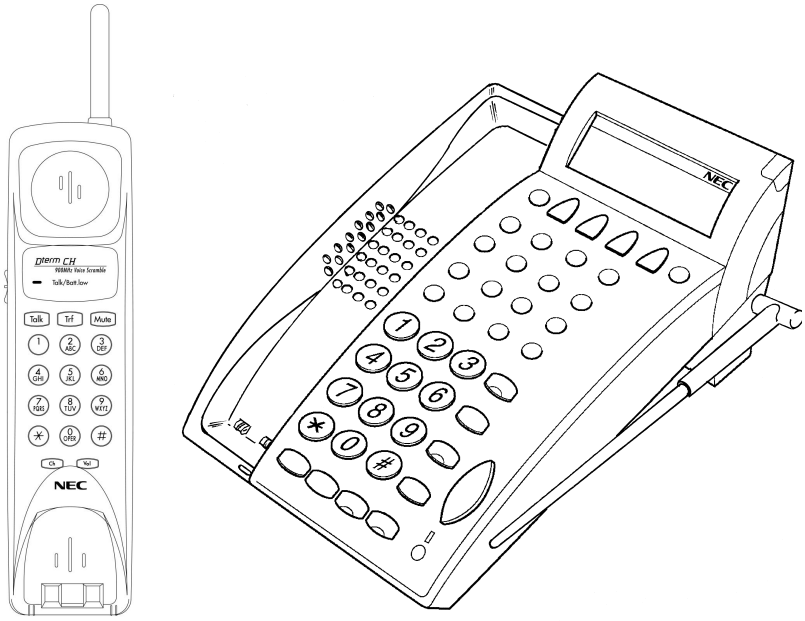

Figure 6-27 D^{term} Handset Cordless Terminal

11.3 Applying Power to the Base Unit

1. Power to charge the battery is supplied from the Telephone line.

2. An ACA-U Unit must be installed in the optional DC24V jack on the Base Unit to provide power for the D^{term} Handset Cordless terminal.

3. Plug the ACA-U Unit into a standard 120 Vac wall outlet.

4. The power level between the Handset and the Base is 10mW.

5. When the ACA-U Unit is used, route the power cord where it does not create a trip hazard or where it could become chafed and create a fire or electrical hazard.

6. An ACA-U Unit is required for this terminal to operate properly.

SECTION 12
INSTALLING A D^term® ANALOG CORDLESS TERMINAL

12.1 Selecting an Installation Location

Select a location to avoid excessive heat or humidity. The base unit should be placed on a desk or tabletop near a standard 120 Vac outlet and within reach of the telephone line connection on the Electra Elite Multiline Terminal. Keep the base unit and the handset away from sources of electrical noise (*e.g.* fluorescent lighting).

Depending on your environment, the maximum number of cordless devices used without interference varies.

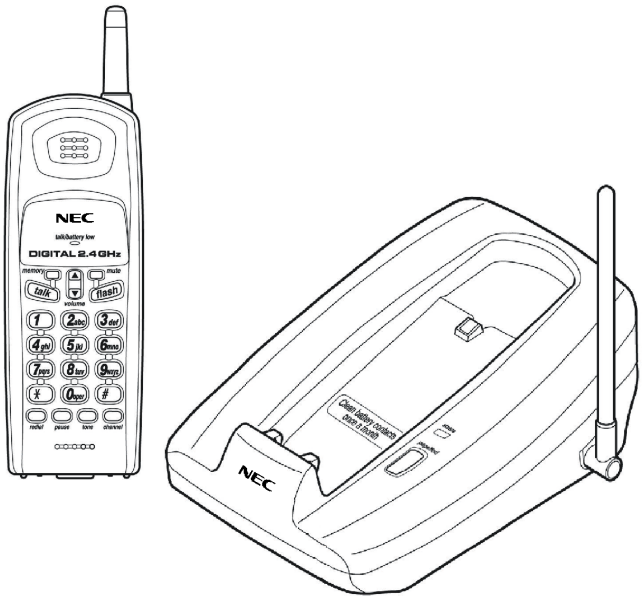

Figure 6-28 D^term Analog Cordless Terminal

12.2 Connecting the Telephone Cord

The DTR-1R-1 D^term Analog Cordless terminal is connected to an analog port on the KSU using an SLI(4)/(8)-U( ) or OPX(2)-U( ) ETU, SLT(1)-U( ) ADP, or APR-U Unit connected to the multiline terminal. A TEL LINE jack is located on back of the base unit of the D^term Analog Cordless terminal.

✆ Never install telephone wiring during a lightning storm.

- ✆ Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- ✆ Use caution when installing or modifying telephone lines.

Using the telephone line cord supplied with the D^{term} Analog Cordless terminal, connect the TEL LINE to the telephone line.

12.3 Applying Power to the Base Unit

1. Plug the AC Adapter connector in the DC IN 9V jack.
2. Route the power cord where it does not create a trip hazard or where it could become chafed and create a fire or other electrical hazards.
3. Plug the AC Adapter in a standard 120 Vac wall outlet.

   ☞ The AC Adapter furnished with this phone should be equipped with a polarized line plug (one blade is wider than the other). This plug fits into the power outlet only one way. When you cannot insert the plug fully into the outlet, reverse the plug. When the plug still does not fit, contact your facilities coordinator about replacing the obsolete plug. Do not alter the shape of the blades of the polarized plug.

SECTION 13
D^term® PS II

13.1 Description

This terminal has wireless communication with a Zone Transceiver (ZT II) that is directly connected to the system. Refer to Figure 6-29 D^term PS II Wireless Terminal.

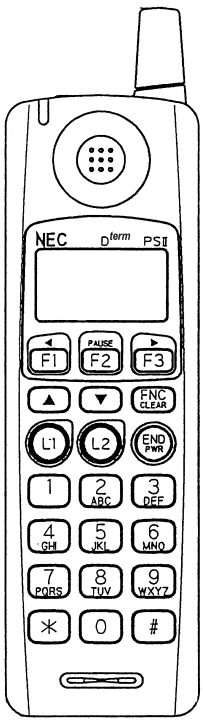

Figure 6-29 D^term PS II Wireless Terminal

SECTION 14
WALL MOUNTING THE DTP-1-1 OR DTP-1-2 TEL AND DTP-1HM-1 OR DTP-1HM-2 TEL

14.1 DTP Hanger Hook

1. Remove the hook from the unit.

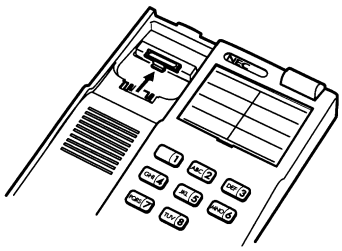

Figure 6-30 Removing the DTP Hook

2. Turn the hook with the tab toward the top.

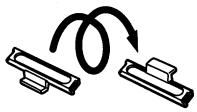

Figure 6-31 Turning the Hook Over

3. Slide the hook on its glides back down into position forming the hanger hook for the handset.

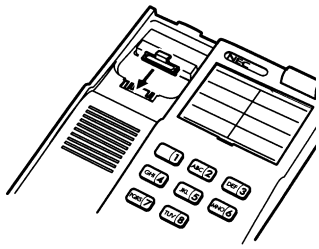

Figure 6-32 Sliding the Hook into Position

14.2 Using a Modular Wall Plate Installed

1. Unscrew the three screws on the unit to remove the plate.

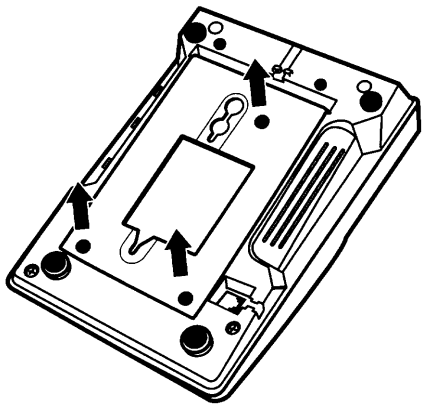

Figure 6-33 Removing the Screws

2. Replace the plate and screw in the two positions. (One remaining screw can be screwed at the original third position.)

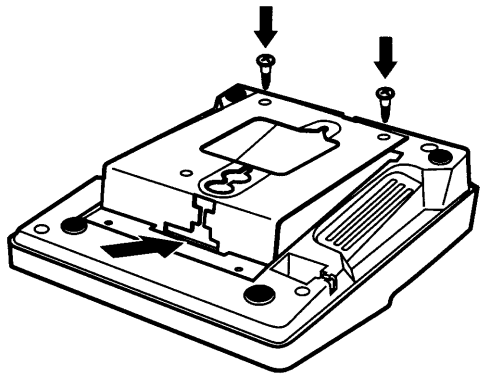

Figure 6-34 Replacing the Plate and Screw

3. Loosen the screws on the wall phone plate to protrude a bit.

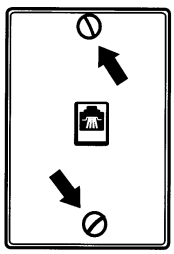

Figure 6-35 Protruding Screws

4. Install the telephone on the protruding screws on the plate.

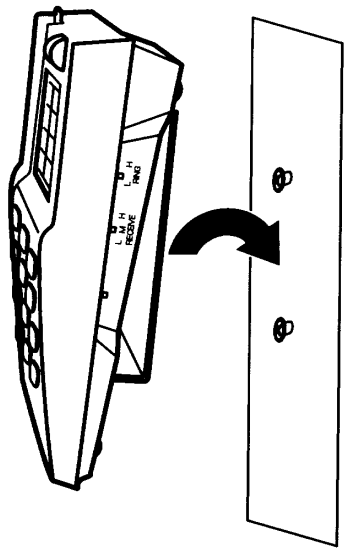

Figure 6-36 Mounting the Telephone

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Installing Optional Equipment

CHAPTER 7

SECTION 1 GENERAL INFORMATION

Optional equipment enhances the Electra Elite 48 system. This equipment can be purchased separately from the system and added as the customer business grows. All adapters can be installed on the Electra Elite Multiline Terminals. With the exception of the VDD-U Unit, the adapters can also be used with D^{term} Series E Multiline Terminals except for DTP-2DT-1. Only the ACA-U Unit adapter can be used on the DTP-16HC-1 TEL.

A Multiline Terminal can have up to three adapters installed at the same time. If attaching an APR-U Unit, CTA-U Unit, CTU(C)-U, CTU(S)-U, HFU-U or VDD-U Unit, an external power supply is required. Only **one** power supply is needed even if more than one adapter is installed.

When an adapter is installed for the first time into a telephone, the base cover on the Multiline Terminal may have to be modified. The base cover has two access panels that are removed before the cover can be closed over the adapters to complete the installation.

SECTION 2 PREPARING MULTILINE TERMINAL FOR ADAPTER INSTALLATION

To prepare the Multiline Terminal for adapter installation:

1. Unplug the telephone cord from the terminal.

2. Turn the terminal upside down. Push the tabs indicated in Figure 7-1 Raising the Base Plate, and raise the inner area of the base plate.

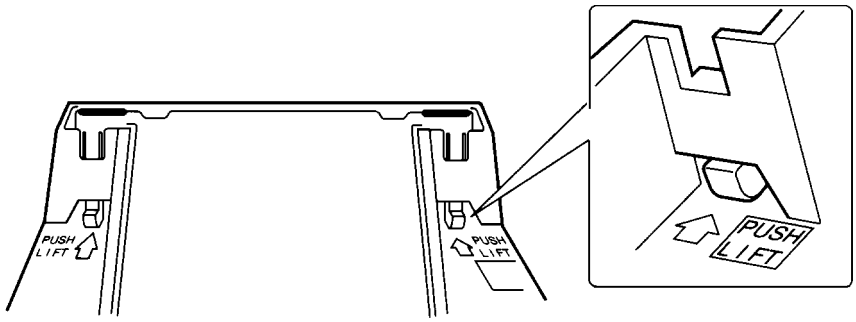


Figure 7-1 Raising the Base Plate

3. Insert flat head screwdriver into A in Figure 7-2 Unlocking Tab and press straight down until tab unlocks.

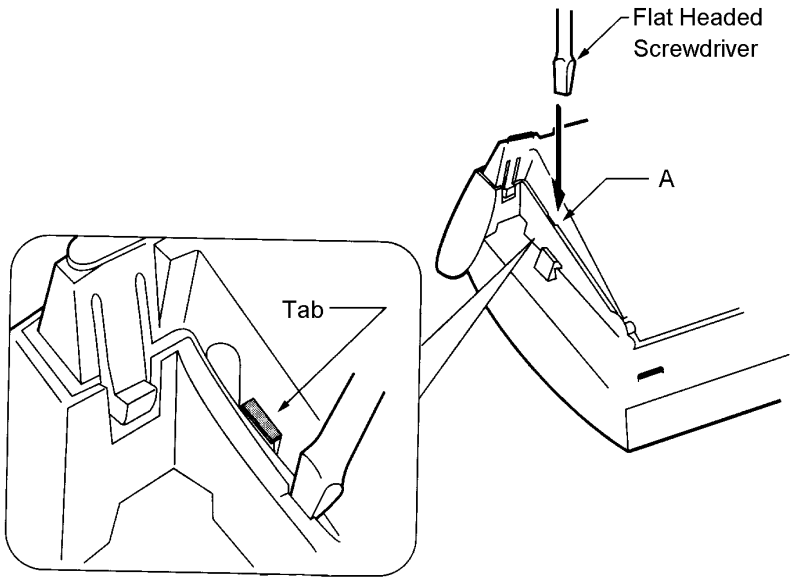


Figure 7-2 Unlocking Tab

4. Lightly press right side of leg, shown as B, in Figure 7-3 Releasing Right Tab, insert flat head screwdriver at C, and press straight down until other tab unlocks.

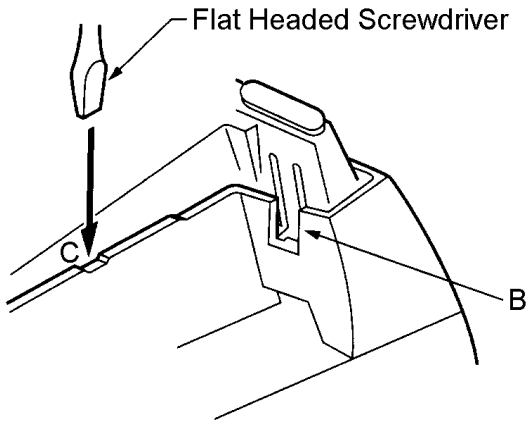


Figure 7-3 Releasing Right Tab

5. Open and remove bottom cover by rotating counterclockwise as shown in Figure 7-4 Removing Bottom Cover.

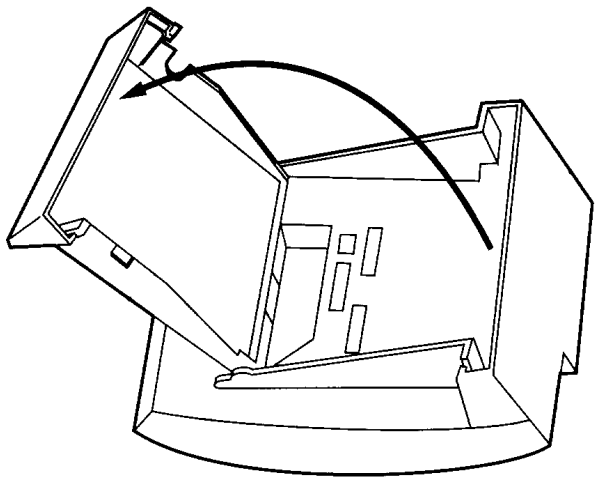


Figure 7-4 Removing Bottom Cover

6. When an adapter is being installed, press tabs A and B to remove the dummy end from the base plate as shown in Figure 7-5 Removing Base Plate Dummy End.

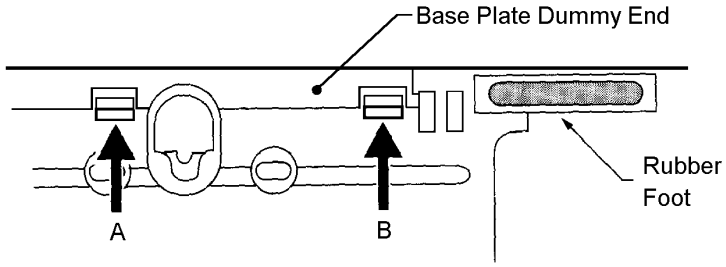


Figure 7-5 Removing Base Plate Dummy End

7. Cut the dummy end in half as shown in Figure 7-6 Cutting Dummy End in Half.

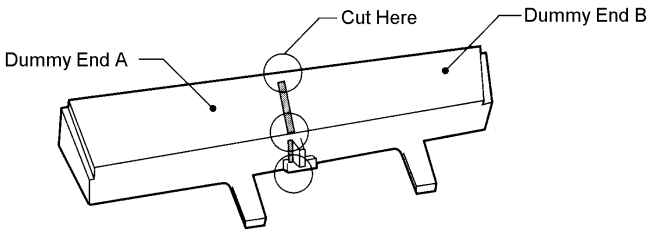


Figure 7-6 Cutting Dummy End in Half

8. When an Adapter is installed in connector 1 as shown in Figure 7-7 Installing Adapter in Connector 1, install dummy end B as shown in Figure 7-8 Installing Dummy End B.

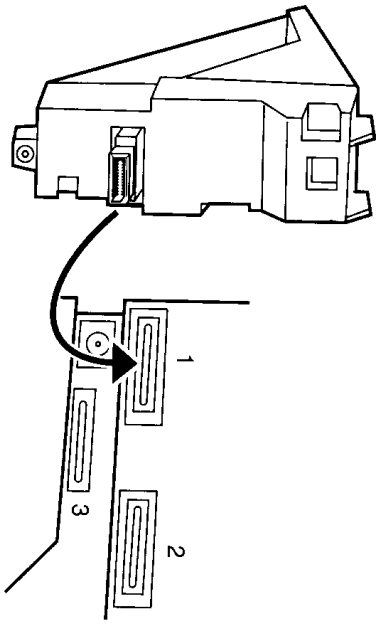


Figure 7-7 Installing Adapter in Connector 1

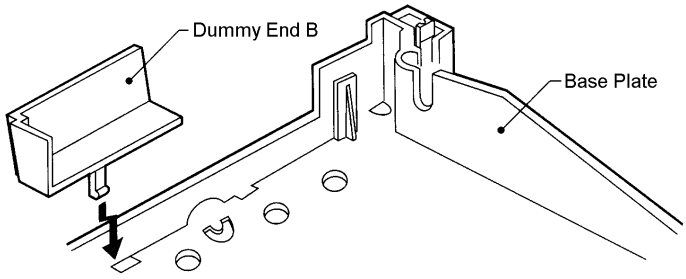


Figure 7-8 Installing Dummy End B

9. When an Adapter is installed in connector 2, install dummy end A in the other slot.

SECTION 3
INSTALLATION PROCEDURES

3.1 ACA-U Unit (AC Adapter)

This unit provides power to ancillary devices, Attendant Consoles or DTP-16HC-1 TELs. Except for the DTP-16HC-1 TEL, the ACA-U Unit must be connected to an adapter that is installed on a Multiline Terminal. If more than one adapter is installed on a Multiline Terminal, only one ACA-U Unit is necessary.

The power requirements for the ACA-U Unit are:

- Input: 120V AC, 60 Hz, 30W
- Output: 24V DC, 750 mA
- Polarity: ⊖——•——⊕

3.1.1 Connecting the ACA-U Unit

1. Unplug the ACA-U Unit from the AC outlet. (Failing to do this can damage the unit and/or the Multiline Terminal.)

2. Prepare Multiline Terminal for adapter installation. Refer to Section 2 Preparing Multiline Terminal for Adapter Installation on page 7-1.

3. Locate the AC Adapter plug on the ancillary device that is connected to the bottom of the Multiline Terminal and plug in the AC Adapter.

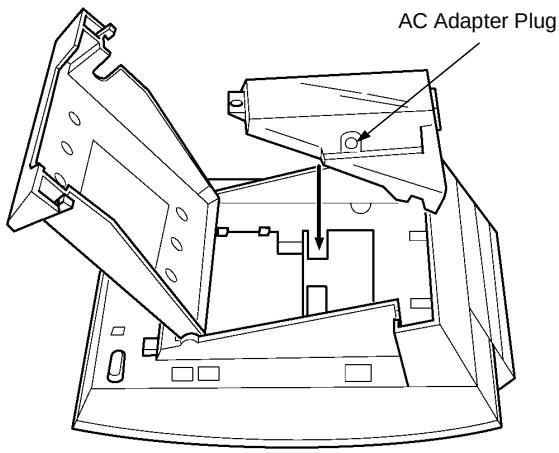


Figure 7-9 ACA-U Unit Connection

3.2 ADA-U Unit (Ancillary Device Adapter)

Ancillary Device Adapters allow connection of a tape recorder to all DTP/DTU Multiline Terminals except for DTP-2DT-1 and DTP-16HC-1.

When installing an ADA-U Unit, first connect the cables to the ADA-U Unit, set the dip switches, and then install the ADA-U Unit on the Multiline Terminal.

3.2.1 Installing an ADA-U Unit on a Multiline Terminal

1. Unplug the telephone cord from the Multiline Terminal.

2. Prepare Multiline Terminal for adapter installation. Refer to Section 2 Preparing Multiline Terminal for Adapter Installation.

3. Press both sides of Base Cover to release latches, lift base cover, and rotate it left to remove it.

4. Plug the ADA-U Unit connector into the receptacle connector on the back of the Multiline Terminal. Snap the ADA-U Unit into the hooks on the Multiline Terminal to secure it.

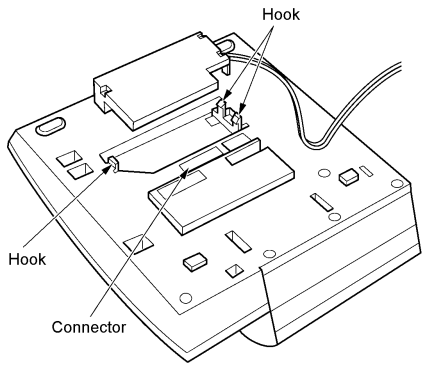


Figure 7-10 Attaching the ADA-U Unit to the Multiline Terminal

5. Replace cover and base plate.

6. Lead the audio cable out through the groove on the base cover. Plug in the telephone cord.

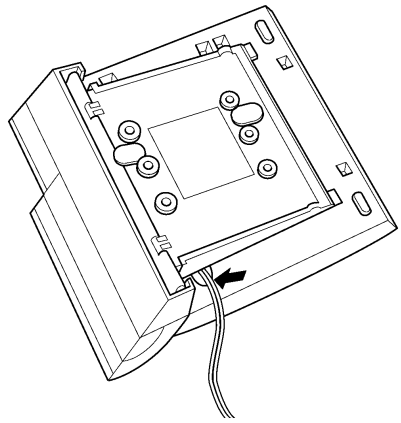


Figure 7-11 Leading the Audio Cable out from the ADA-U Unit

3.2.2 Connecting Cables to the ADA-U Unit

Cable terminal connectors are located on the right side of the ADA-U Unit. Cables should be connected on this unit before installing the unit on the Multiline Terminal.

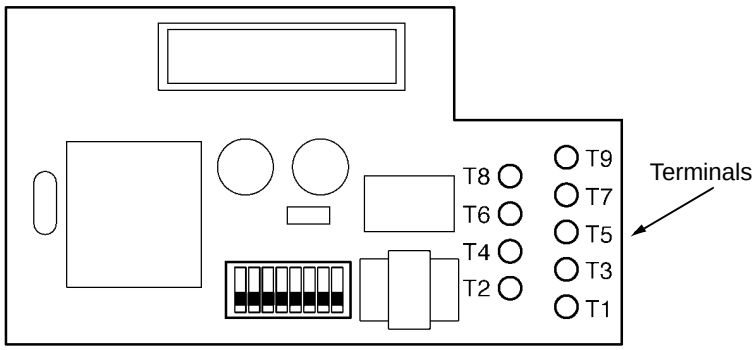


Figure 7-12 ADA-U Unit

1. Cut off the plug on one end of the cable.

2. Locate the adapter terminals on the right side of the unit as illustrated in Figure 7-12 ADA-U Unit.

3. Remove the cap on the adapter terminal to expose the metal receptacle. Push the cable in the applicable receptacle, and replace the cap. Line up the slot on the cap with the slot on the metal receptacle to ensure proper contact. Refer to Figure 7-13 Attaching Cables to the ADA-U Unit.

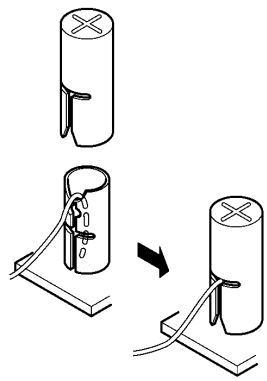


Figure 7-13 Attaching Cables to the ADA-U Unit

4. Insulate the end of the cable that needs to be shielded with insulating tape.

   Table 7-1 ADA-U Cable Connections provides a list of cable connections to ADA-U ADP terminals and describes the specifications for the terminals.

Table 7-1 ADA-U Cable Connections

Terminal Number	Cables to Connect	Terminal Specifications
T1	When warning tone is not being sent from the recorder, connect wire pair input from tone generator to T1:T2. The warning tones from the generator are sent to T1:T2 on a dedicated wire pair while the speech path is sent from the ADA-U on T3:T4 over a separate wire pair to the recorder.	Input Terminal: T1 and T2 are enabled for tone generating device when DIP switches 3 and 4 are OFF. (When switches 3 and 4 are ON, a humming sound may be recorded due to impedance mismatch.) Input Impedance on T1 and T2: 100K Ω Input Level on T1 and T2: –15 dB ~ 40 dB
T2		
T3:T4	Connect recorder device wire pair speech input to T3:T4. When the recorder used supplies a warning tone, this tone may also be sent over the T3:T4 wire pair back to the terminal.	Input/Output Terminal: Refer to dip switch settings in Table 7-2 ADA-U Unit Switch Settings.
T5	Connect the bare end of the control cable.	When a Multiline Terminal is idle, this contact is closed. When the Multiline Terminal goes off-hook (using the handset, headset, or speakerphone), this contact is open. ***When recorder owner manual specifies start on open circuit, connect T5 and T6.***
T6	Connect the shielded end of the control cable.	Provides common connection for control cable.
T7	Connect the bare end of the control cable.	When the Multiline Terminal is idle, this contact is open. When the Multiline Terminal is busy (using the handset, headset, or speakerphone), this contact is closed. ***When recorder owner manual specifies start on closed circuit, connect T6 and T7.***
T8	Unused	
T9	Unused	

Table 7-1 ADA-U Cable Connections (Continued)

Notes:

- ☞ When recording in handsfree (half-duplex) mode using the built-in speakerphone, the record warning tone may not be audible to the far-end party.
- ☞ The transmit recording level is lower than the receiving voice level for intercom calls; the transmit recording level for CO calls is normal.
- ☞ Depending on the recording device(s), separate cables may be required for the warning tone and speech path. In this case, connect the warning tone cables to input terminals T1 and T2 on the ADA-U Unit. (T3 and T4 are used as the tape recorder input.)
- ☞ When remote control of the recorder is necessary, the record start/stop control is provided by connecting to T5 (or T7) and T6 on the ADA-U Unit. (Connecting to T5 or T7 is determined by the specifications of the recorder.)
- ☞ When a warning Tone is provided from the recording equipment, it should be input via T3 and T4 on ADA-U Unit. (Do not use T1 and T2 to input Beep Tone.)
- ☞ Conversations cannot be recorded from terminals connected to an APR-U Unit. Speakerphone calls through the HFU-U Unit cannot be recorded.

3.2.3 Switch Settings

The DIP Switch is located at the bottom center of the ADA-U Unit. The DIP Switch allows a technician to configure the board to specific settings. Figure 7-14 ADA-U Unit Switch Settings shows the default settings.

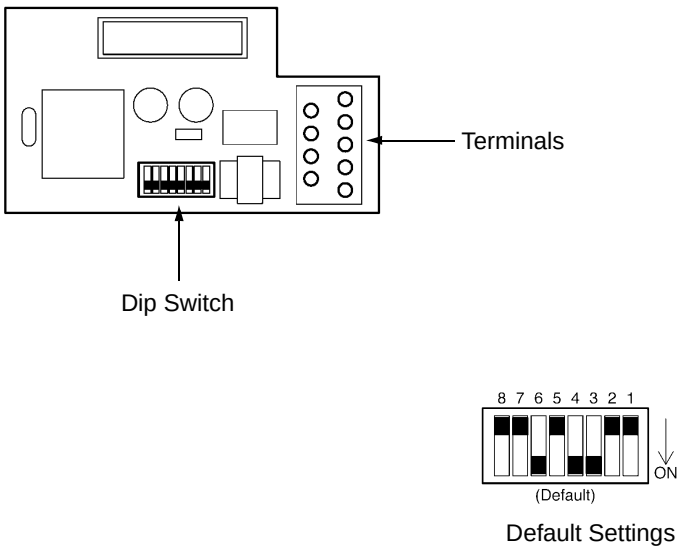


Figure 7-14 ADA-U Unit Switch Settings

The following switch settings should be made on the ADA-U Unit to enable or disable the record start warning tone. Switch settings should be made before installing the ADA-U Unit in the Multiline Terminal. Refer to Table 7-2 ADA-U Unit Switch Settings.

Table 7-2 ADA-U Unit Switch Settings

Switch	Setting		Description
SW1–1	Off		When the ADA-U provides control to the recorder, SW1-1 must be On.
SW1–2	Off		Leave Off
SW1–3 and SW1-4	SW1–3 On	SW1–4 On	Warning Tone from recording device over same wire pair as speech path.
	SW1–3 Off	SW1–4 Off	Warning Tone from recorder or generator equipment on dedicated wire pair to recorder MIC input
SW1–5 and SW1–6	SW1–5 Off	SW1–6 On	Input impedance is 600 Ω
	SW1–5 On	SW1–6 Off	Input impedance is less than 30Ω
SW1–7	On		When warning tone from any device is sent to telephone
SW1–8	Off		Leave Off

☞ Do not connect T1 and T2 when switches SW1–3 and SW1-4 are ON.

3.3 APA-U Unit (Analog Port Adapter)

The Analog Port Adapter without Ringer is the interface for installing Single Line Telephones, Modems, Credit Card Readers, Wireless Headsets, NEC VoicePoint/VoicePoint Plus Conferencing unit, and other compatible analog devices. The APA-U Unit does not generate ringing signals. One user-adjustable switch with two settings is provided on the adapter. Setting 1 allows impedance to be set to 600Ω for devices such as modems. Setting 2 is used for complex impedance devices such as a Single Line Telephone.

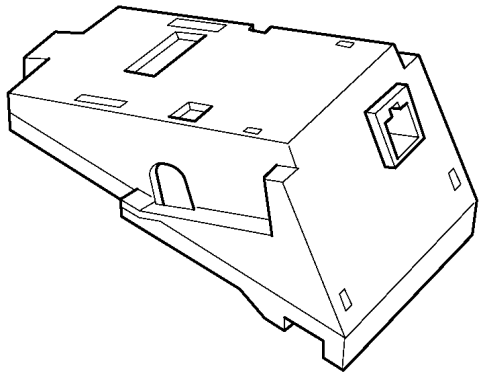


Figure 7-15 APA-U Unit

3.3.1 Installing APA-U Unit on any DTP/DTU Multiline Terminal except DTP-2DT-1 and DTP-16HC-1

1. Prepare Multiline Terminal for adapter installation. Refer to Section 2 Preparing Multiline Terminal for Adapter Installation.

2. Plug the unit into the receptacle connector inside the base plate. Refer to Figure 7-16 Attaching the Unit to the Multiline Terminal.

☞ The APA-U Unit **does not** require an ACA-U Unit to supply external power.

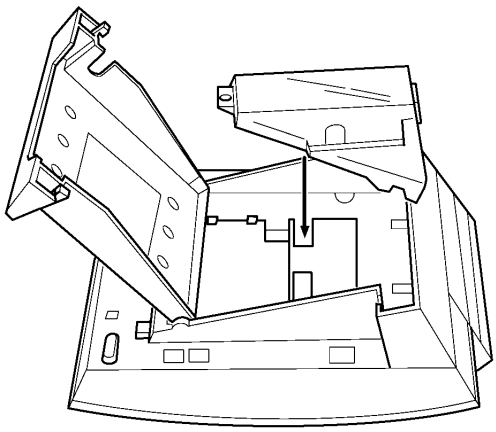


Figure 7-16 Attaching the Unit to the Multiline Terminal

3. Close the base plate, and snap the cover in place.

4. Install a ferrite core (provided with the APA-U Unit) by looping line cord through the core between the terminal (1 inch from the terminal) and ESI(8)-U( ) ETU. This core is only used with the APA-U Unit.

5. Plug in the power cord on the AC adapter and the telephone cord in the jack.

3.3.2 Switch Settings

The APA-U Unit has one switch.

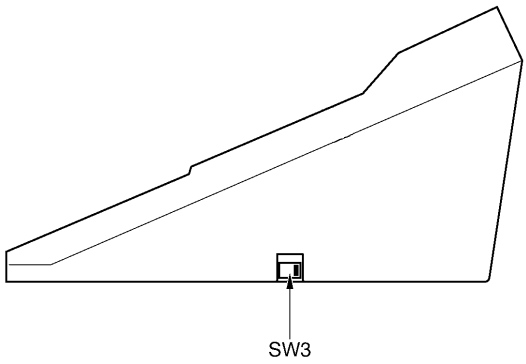


Figure 7-17 APA-U Unit Switches

Refer to Table 7-3 APA-U Unit Switch Settings for SW3.

Table 7-3 APA-U Unit Switch Settings for SW3

Switch	Description
SW3–1	Sets impedance to 600Ω for devices such as modems or facsimile machines.
SW3–2	Used for complex impedance devices such as Single Line Telephones.

3.3.3 Connecting Cables on the APA-U Unit

Plug the telephone cord from the Single Line Telephone into the modular jack on the APA-U Unit. Refer to Figure 7-18 Connecting Cables on the APA-U Unit.

Limit the cable length from the APA-U Unit to the Single Line Telephone to a maximum of 50 feet.

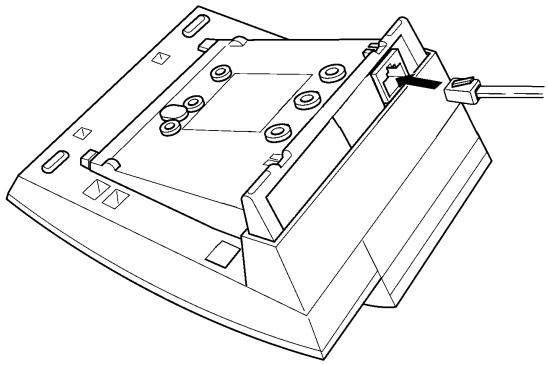


Figure 7-18 Connecting Cables on the APA-U Unit

3.4 APR-U Unit (Analog Port Ringer)

The Analog Port Adapter with Ringing provides an interface for installing Single Line Telephones, modems, NEC VoicePoint/ VoicePoint Plus Conferencing unit, and other compatible analog devices. The APR-U Unit also generates ringing signals. By providing ring generation, the user can install a personal fax machine or an answering machine for convenience. Two user-adjustable switches are provided on the adapter; one allows for 600Ω or a complex impedance interface to devices such as a modem or Single Line Telephone, the second switch (SW1) is set to position 2.

An AC Adapter is Required.

When a CTA-U, CTU(C)-U, CTU(S)-U, VDD-U, or HFU-U Unit and an APR-U Unit are both installed, only one AC Adapter is required.

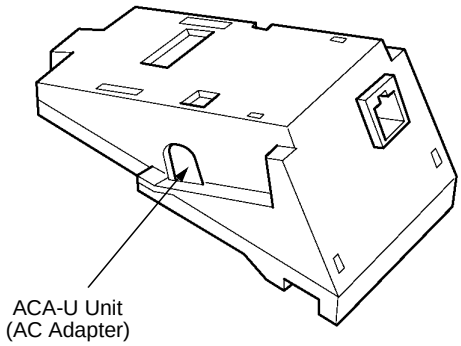


Figure 7-19 APR-U Unit

3.4.1 Installing APR-U Unit on any DTP/DTU Multiline Terminal but DTP-2DT-1/DTP-16HC-1.

1. Prepare Multiline Terminal for adapter installation. Refer to Section 2 Preparing Multiline Terminal for Adapter Installation.

2. Plug the unit into the receptacle connector inside the base plate. Refer to Figure 7-20 Attaching the Unit to the Multiline Terminal.

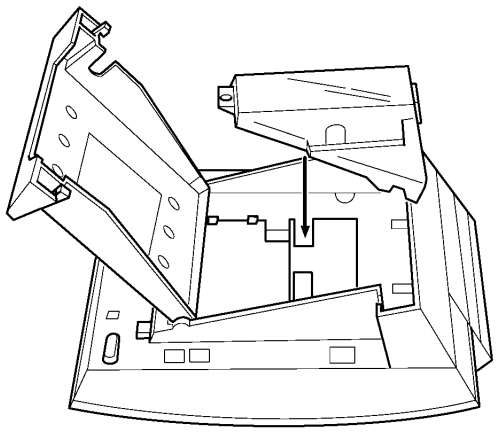


Figure 7-20 Attaching the Unit to the Multiline Terminal

3. Plug the cord of the ACA-U Unit (AC adapter) into the jack on the APR-U Unit. Lead the telephone cord out through the groove in the base as shown in Figure 7-21 Leading the Telephone Cord out from the Unit.

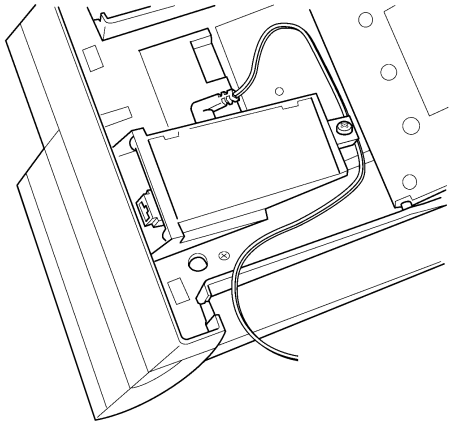


Figure 7-21 Leading the Telephone Cord out from the Unit

4. Close the base plate, lead the AC adapter cord out through the hole, and snap the cover in place.

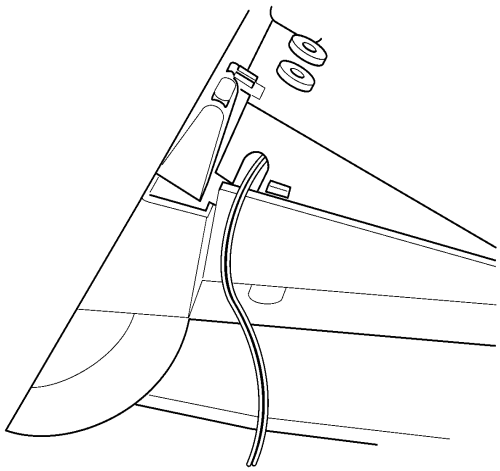


Figure 7-22 Closing the Base Plate Cover

5. Install a ferrite core (provided with the APR-U Unit) by looping line cord through the core between the terminal (1 inch from the terminal) and ESI(8)-U10 ETU. This core is only used with the APR-U Unit.

6. Plug in the power cord on the AC adapter and the telephone cord in the jack.

3.4.2 Switch Settings

The APR-U Unit has two switches.

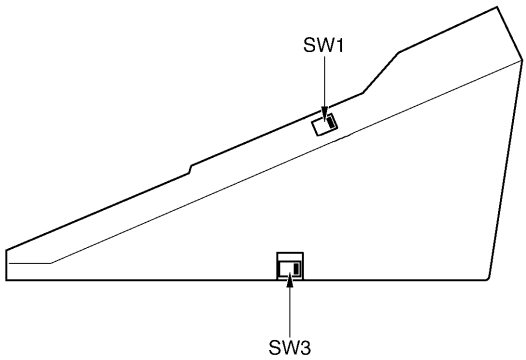


Figure 7-23 APR-U Unit Switches

Refer to Table 7-4 APR-U Unit Switch Settings for SW1 and SW3.

Table 7-4 APR-U Unit Switch Settings for SW1 and SW3

Switch	Description
SW1–1	Do not use.
SW1–2	A Single Line Telephone and Multiline Terminal are used alternately. (The Multiline Terminal and the APR-U Unit share the same B1 channel.)
SW3–1	Sets impedance to 600Ω for devices such as modems or facsimile machines.
SW3–2	Used for complex impedance devices such as Single Line Telephones.

3.4.3 Connecting Cables on the APR-U Unit

Plug the telephone cord from the Single Line Telephone into the modular jack on the APR-U Unit.

Limit the cable length from the APR-U Unit to the Single Line Telephone to a maximum of 50 feet.

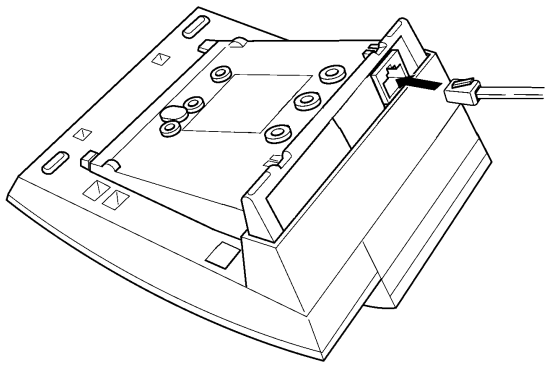


Figure 7-24 Connecting Cables on the APR-U Unit

3.5 CTA-U Unit (Computer Telephony Adapter)

Computer Telephony Adapter allows a DTP or DTU Multiline Terminal connection to a PC. The PC can perform all Multiline Terminal functions using a TAPI-compatible application software.

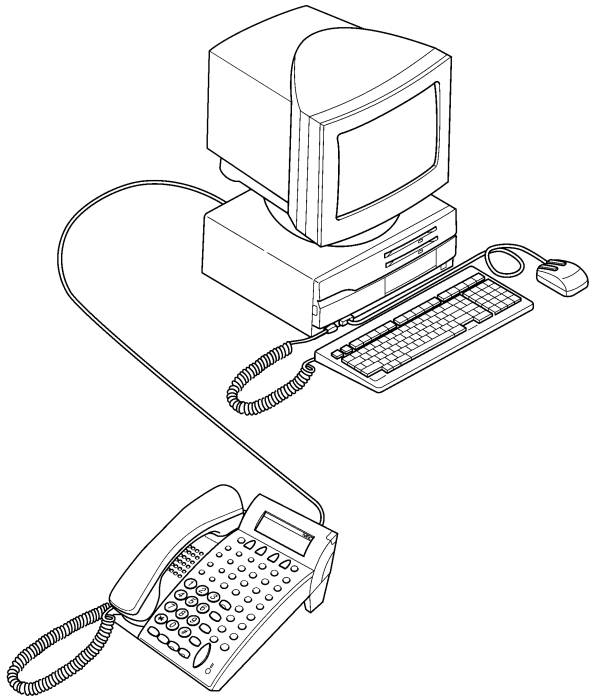


Figure 7-25 Attaching an Electra Elite Multiline Terminal to a PC

The CTA-U Unit is attached to the bottom of any DTP/DTU Multiline Terminal except DTP-2DT-1 and DTP-16HC-1.

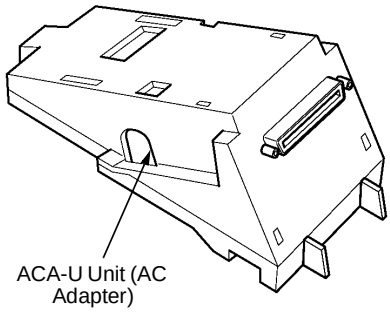


Figure 7-26 CTA-U Unit

3.5.1 Installing the CTA-U Unit

1. Prepare Multiline Terminal for adapter installation. Refer to Section 2 Preparing Multiline Terminal for Adapter Installation.

2. Plug the unit into the receptacle connector inside the base plate on the Multiline Terminal. Refer to Figure 7-27 Attaching the Unit to the Multiline Terminal.

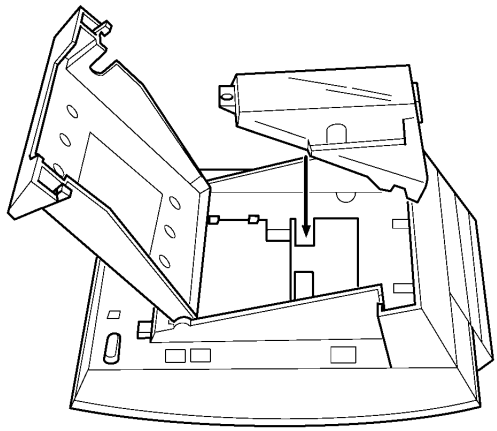


Figure 7-27 Attaching the Unit to the Multiline Terminal

3. Close the base plate.

3.5.2 Connecting the Cables on the CTA-U Unit

Connect the RS-232C cable from the computer to the connector on the CTA-U Unit as shown in Figure 7-28 Connecting the RS-232C Cable to the CTA-U Unit on the Multiline Terminal.

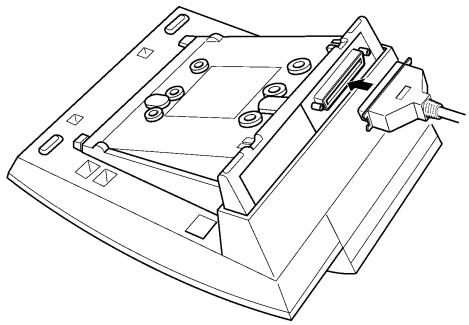


Figure 7-28 Connecting the RS-232C Cable to the CTA-U Unit on the Multiline Terminal

3.5.3 Installing the Driver on the PC

Using the setup disk provided with the CTA-U Unit install the driver onto your PC. Refer to the *CTA installation Guide* for instructions on installing CTA setup disks.

3.6 Computer Telephony Adapter with USB Interface

The CTU adapter connects to a PC USB port to provide telephony and sound device control. The general functions include:

- Telephony Control

  The application is based on the Microsoft Telephony Application Programming Interface (TAPI) and provides call handling on the PC (*e.g.*, call, answer, Hold, Transfer, Conference, or Caller ID).

- User Interface to support *D*^{term} Emulation

  This function provides the functions of *D*^{term} such as normal telephone indications, LCD, Line keys, or Hookswitch.

- Sound Support

  Allows voice recording and playing on an audio device assigned to the PC. Voice Mail and Live Record are supported on the PC.

- Plug and Play Support
- Headset Operation

  When CTU and TAPI are used to set data for TSP, the headset button can be controlled by TSP.

- USB Interface

  This adapter uses Full Speed (12Mbps) as defined in the USB Specification.

3.6.1 CTU(C)-U Unit Connections

This Computer Telephony adapter connects a Universal Serial Bus to a Coreline port on the VDH2(8)-U( ) ETU and can be connected to any DTP/DTU Multiline Terminal except DTP-2DT-1 and DTP-16HC-1.

A required AC Adapter is provided with the unit.

The following connections are required:

- AC Adapter
- Multiline Terminal jack labeled LINE
- PC USB port
- Coreline interface to VDH2(8)-U( ) ETU
- LAN cable to PC

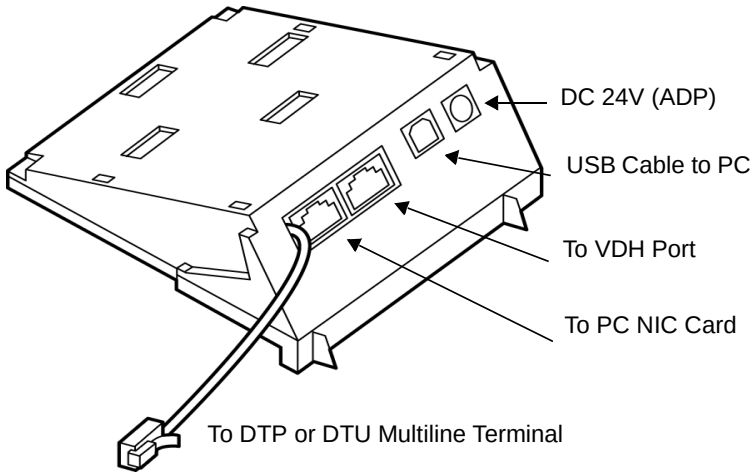


Figure 7-29 CTU(C)-U Unit

3.6.2 CTU(S)-U Unit Connections

This Computer Telephony Application adapter connects a Universal Serial Bus to an ESI(8)-U( ) ETU and can be connected to any DTP/DTU Multiline Terminal except DTP-2DT-1 and DTP-16HC-1.

A required AC Adapter is provided with the unit.

The following connections are required:

- AC Adapter
- Multiline Terminal jack labeled LINE
- PC USB port
- ESI port to ESI(8)-U( ) ETU

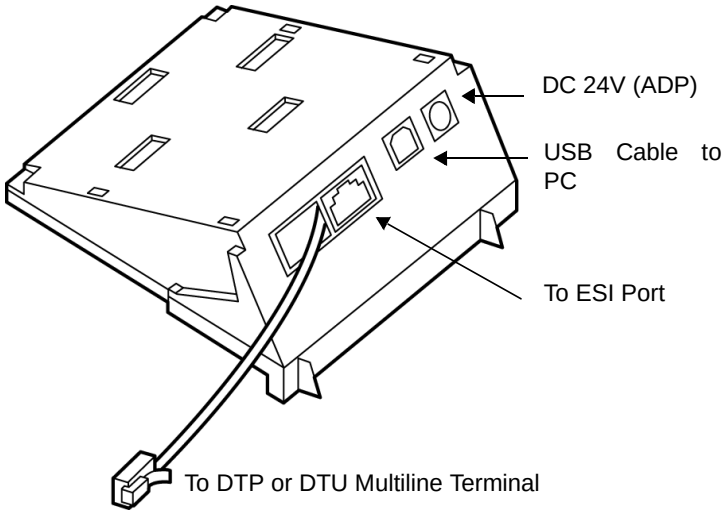


Figure 7-30 CTU(S)-U Unit

3.7 DBM(B)-U( ) Box and DBM(E)-U( ) Box Message Display Boards

The DBM(B)-U( ) basic Message Display Board is connected to the ESI(8)-U( ) ETU to provide a message waiting LED for voice mailboxes of personnel without a normal telephone. Each board has eight message waiting LEDs, and up to eight boards can be installed in the Electra Elite 48 system to support 64 LEDs.

The DBM(E)-U( ) expansion Message Display Board has eight message waiting LEDs and is connected to the DBM(B)-U( ) or another expansion board. Each DBM(B)-U( ) basic board can support up to five expansion boards and 40 additional LEDs.

The total number of LEDs is 384, but the Electra Elite 48 System can only support up to 200 mailbox indications. Multiple locations of the same mailbox are permitted. Refer to Figure 7-31 DBM(B)-U( ) and DBM(E)-U( ) Message Display Boards and Figure 7-32 Maximum Display Indications.

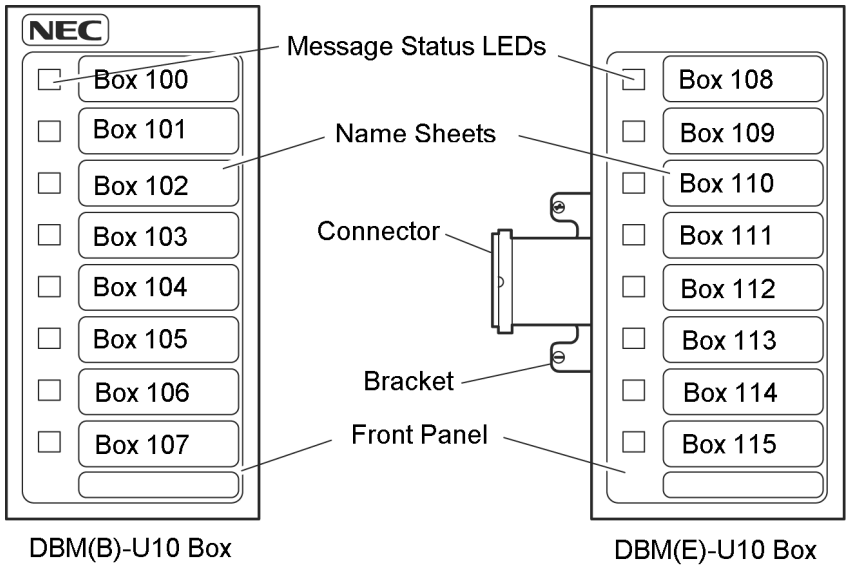


Figure 7-31 DBM(B)-U( ) and DBM(E)-U( ) Message Display Boards

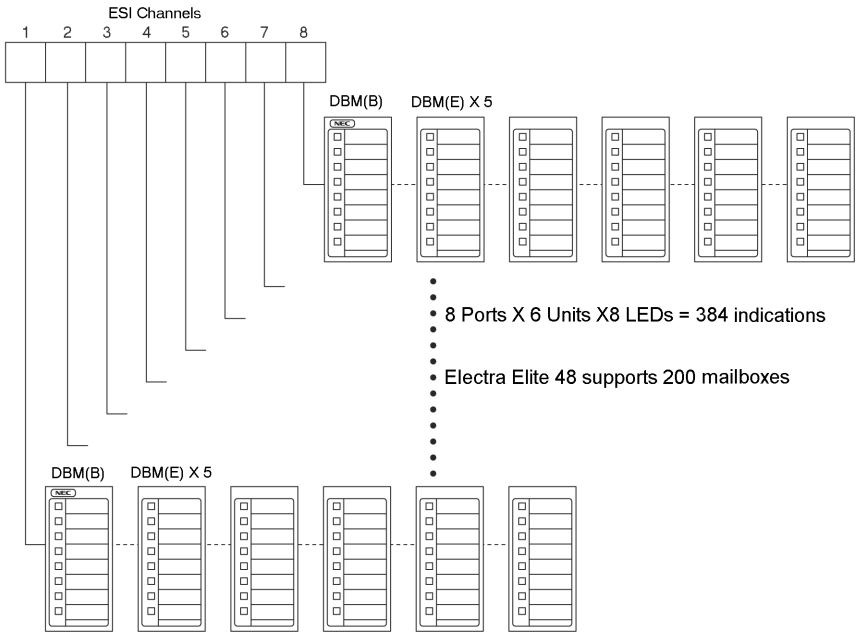

ESI Channels
1 2 3 4 5 6 7 8
DBM(B)
DBM(E) X 5
8 Ports X 6 Units X8 LEDs = 384 indications
Electra Elite 48 supports 200 mailboxes
DBM(B)
DBM(E) X 5

Figure 7-32 Maximum Display Indications

3.7.1 Connecting DBM(E)-U( ) Box to DBM(B)-U( ) Box or Another DBM(E)-U( ) Box

1. Use wire cutters to remove the cutout on right side of DBM(B)/(E) cover. Refer to Figure 7-33 Removing Cutout. Place the provided edge protector on the top of the cutout.

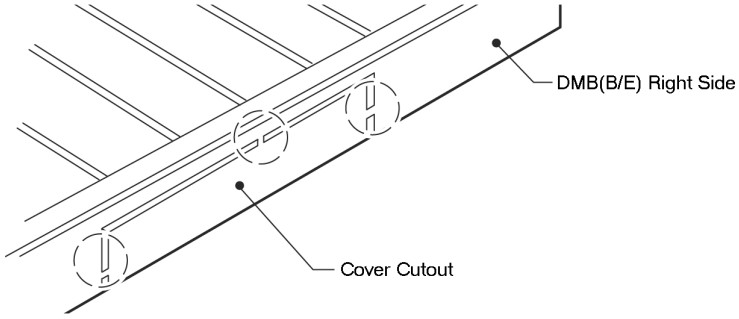


Figure 7-33 Removing Cutout

2. Remove display plate from DBM(B/E) and DBM(E), and peel off the cover sheet on both.
3. Insert protruding side of cable from the DBM(E) in DBM(B) CN7 or in CN7 of the previous DBM(E).
4. Slide the bracket on DBM(E) being installed into the groves on DBM(B)/(E), and tighten the nuts and bolts. Refer to Figure 7-34 Connecting the Bracket.

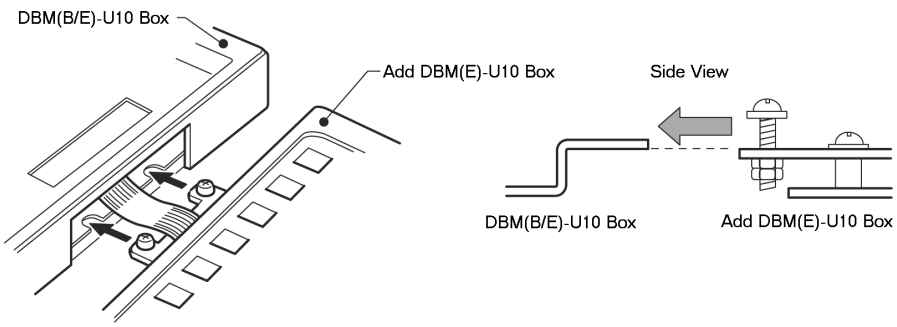


Figure 7-34 Connecting the Bracket

5. Ensure that the internal end of the cable is connected to DBM(E) CN2.

   ☞ The second expansion board must have this cable connected internally to DBM(E) CN3 and externally to the first DBM(E) CN7. The third, fourth, and fifth expansion board cables are connected externally to the previous DBM(E) CN7 and internally to CN4, CN5, and CN6 respectively.

6. After all expansion boards are connected, place the white cover sheets back on the DBM(B)-U( ) and all expansion boards, and install the display panels.

3.7.2 Wall Mounting DBM(B)-U( ) and Expansion Boards

1. Refer to the template, and thread the included screw into the wall at location for the top hole of the DBM(B)-U( ) Box. Leave screw extended 1/8 inch. Refer to Figure 7-35 Threading Screw into Wall.

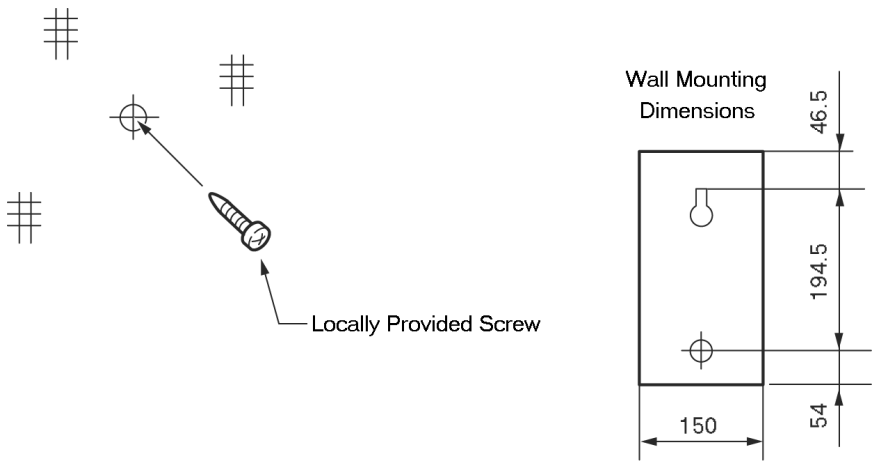


Figure 7-35 Threading Screw into Wall

2. Place hole for mounting over the screw, and Hang the DBM(B)-U( ) on the screw. Refer to Figure 7-36 Hanging DBM(B)-U( ) on Screw.

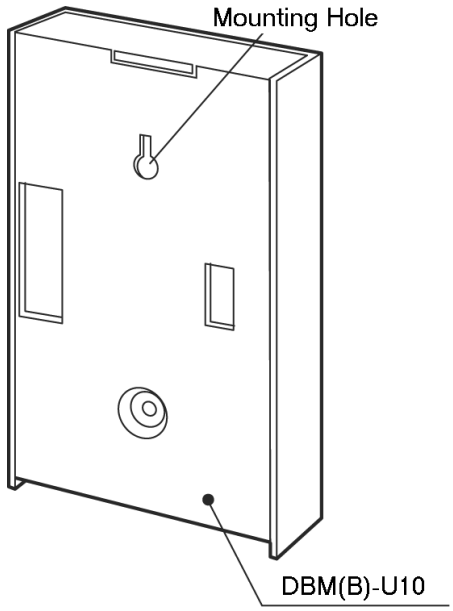


Figure 7-36 Hanging DBM(B)-U( ) on Screw

3. Remove the display panel to access screws, and thread the **in place** bottom screws on the outside boards into the wall. Refer to Figure 7-37 Installing Bottom Screws.

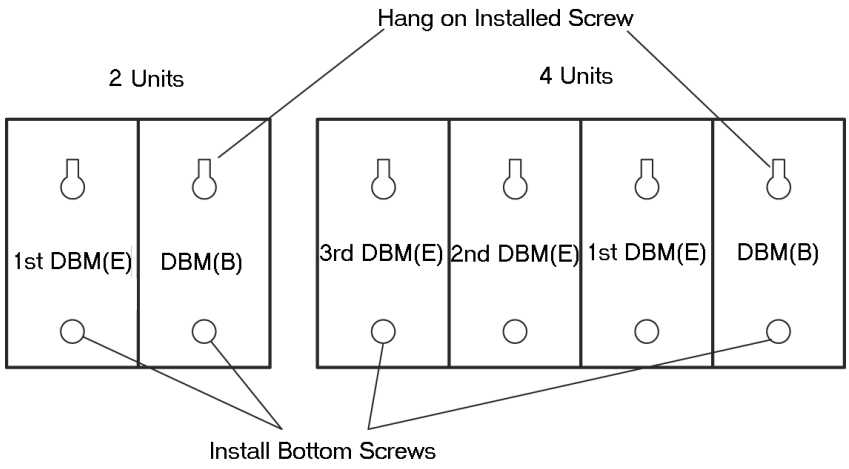


Figure 7-37 Installing Bottom Screws

4. Tighten the top screw on the DBM(B)-U( ) Box.

   ☞ When four or five expansion boards are used, install the bottom screw on the middle unit as well.

3.7.3 Connecting the DBM(B) to Power and ESI

1. Refer to Figure 7-38 Connecting DBM(B)-U( ), and Connect the provided AC Adapter to the DBM(B)-U10.

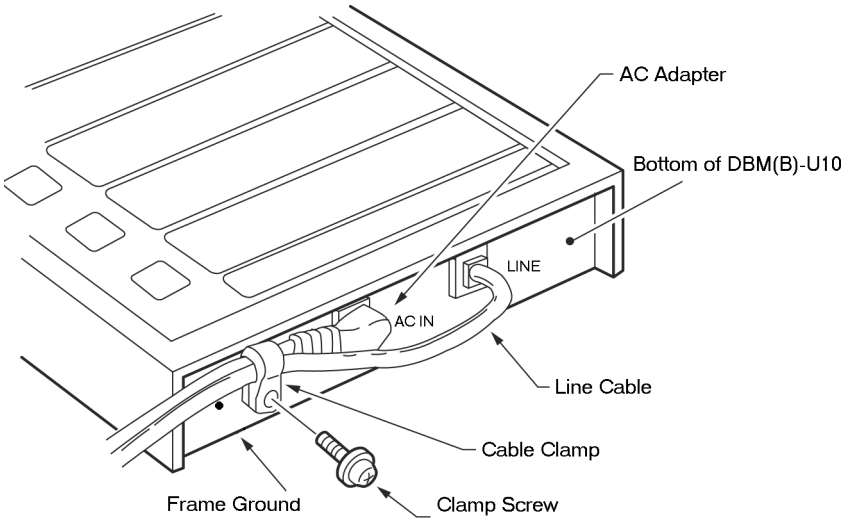


Figure 7-38 Connecting DBM(B)-U( )

2. Connect the line cable to the DBM(B)-U( ).
3. Place the clamp around the cables, insert the clamp screw, and attach clamp to the DBM(B)-U( ).
4. Refer to Figure 7-39 Connecting DBM(B)-U( ) to ESI Port, and connect the display board system to ESI.

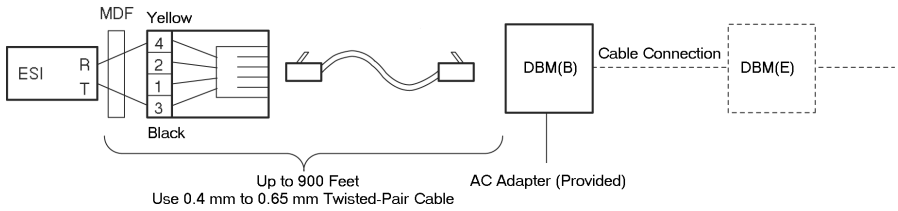


Figure 7-39 Connecting DBM(B)-U( ) to ESI Port

3.8 HFU-U Unit (Handsfree Unit)

The Handsfree Unit provides full-duplex handsfree communication. Large areas may cause poor full-duplex operation. This unit comes with the handsfree adapter and an external microphone. With the terminal upside down, facing from the bottom of the open cover, install this unit in Slot 1 of the telephone.

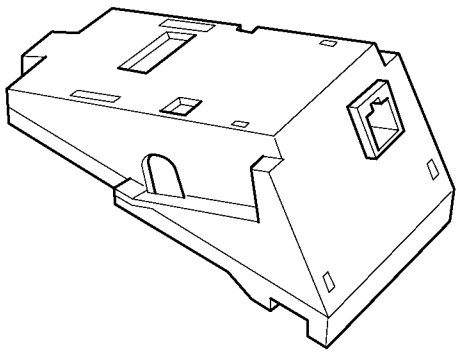


Figure 7-40 HFU-U Unit

3.8.1 Installing an HFU-U Unit on any DTP/DTU Multiline Terminal but DTP-2DT-1/DTP-16HC-1

Refer to 3.4.1 Installing APR-U Unit on any DTP/DTU Multiline Terminal but DTP-2DT-1/DTP-16HC-1. The instructions for installing these units are the same.

3.8.2 Installing the External Microphone

An external microphone can be installed on the HFU-U Unit. These instructions apply to the external microphone obtained from NEC. This microphone is equipped with a mute button.

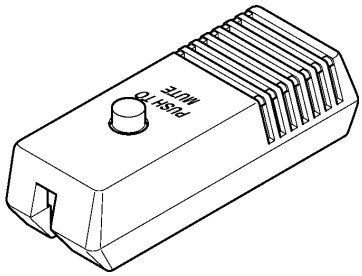


Figure 7-41 Microphone with Mute

1. Plug the microphone cord into the jack on the HFU-U Unit as shown in Figure 7-42 Attaching a Microphone to a Multiline Terminal.

   ☞ The microphone should be at least one foot away from the Multiline Terminal, but not more than three feet.

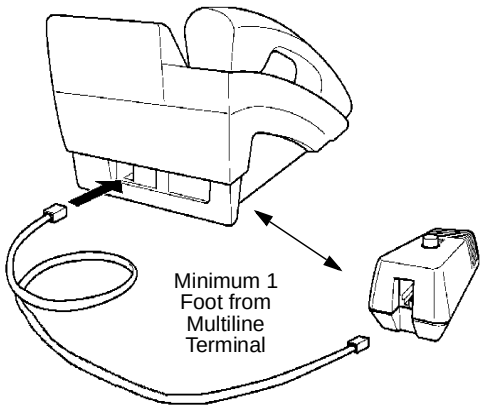


Figure 7-42 Attaching a Microphone to a Multiline Terminal

3.8.3 Switch Settings

The HFU-U Unit uses 2-position switches SW1 and SW2 on the HFU-U Unit.

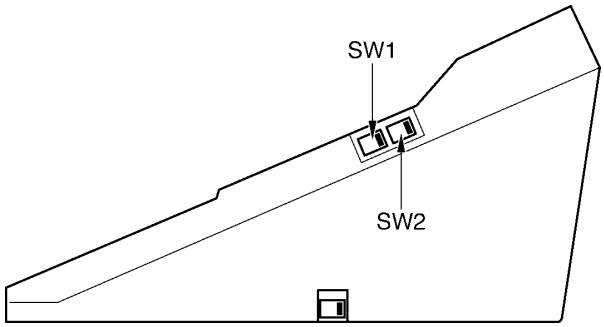


Figure 7-43 HFU-U Unit Switches

Refer to Table 7-5 HFU-U Unit Switch Settings.

Table 7-5 HFU-U Unit Switch Settings

SW1		SW2		Description
Position 1	**Position 2**	**Position 1**	**Position 2**	
OFF	ON	OFF	ON	Full Duplex (Default)
ON	OFF	OFF	ON	Half Duplex (6db mix ratio)
OFF	ON	ON	OFF	Half Duplex (12db mix ratio)
ON	OFF	ON	OFF	Half Duplex (18db mix ratio)

☞ Full Duplex: In some large areas or noisy locations half duplex should be used. There are limits to the echo canceling ability of the HFU-U.

☞ Half Duplex: When voice clipping occurs, use a lower decibel setting.

3.9 PCT( )-U( ) Unit (PC Telephony Board)

The NEC PC Board is a multifunction PC-AT add-in card with telephone, sound system, fax, and modem abilities and combines multimedia audio, Telephone Application Programming Interface (TAPI), and a 33.6K fax/data modem. The board is available with/ without the built-in modem.

The PC Board replaces an NEC desk set as the primary telephone device; the telephone line from the wall now plugs directly into the PC board instead of the desk set. The desk set can be connected to the PC board and used as an adjunct or auxiliary telephone. An external microphone and external speakers can also be connected to the PC Board.

The PC Board allows telephone operations with a headset or microphone and has the following audio abilities:

- Records audio from the calling or called party of a telephone conversation
- Records audio from both parties of a telephone conversation
- Records audio (or music) from a microphone, line-level device, or CD player
- Plays live or recorded audio (or music) through an adjunct telephone, handset or stereo speakers

The PC Board uses Computer Technology Integration (CTI) technology through Microsoft Windows 95 or higher to support speech and data transmission, allow a variety of attachment devices, and support complex calling features such as conference calls, call waiting, and voice mail.

The PC Board supports the following terminals:

- D^{term} Series III Multiline Terminals
- D^{term} Series E Multiline Terminals
- Electra Professional Multiline Terminals
- Electra Elite Multiline Terminals

The NEC PC Telephony board can be installed on the ISA bus on any IBM-compatible PC.

Refer to the PCT Installation Guide provided with the PCT( )-U for installation instructions.

3.9.1 Connecting a MIC/Line-In

- When using the microphone input (MIC), connect an electric condenser microphone. Phantom power (-2.2 Vdc) is supplied.
- When using the line-level input (Line-In), connect to a line-level device such as a CD or cassette player.

3.10 SLT(1)-U( ) ADP (Single Line Telephone)

The Single Line Telephone adapter provides an interface for Single Line Telephones and other similar devices from an ESI ETU channel. This adapter can be connected to any ESI port.

3.10.1 Connecting the SLT(1)-U( ) ADP to the System

1. Connect one end of the RJ-11 to the ESI port on the KSU and one end to the **ESI** jack on the SLT Adapter.

2. Connect one end of a second RJ-11 to the **TEL** jack on the SLT Adapter and the other end to the Single Line Telephone.

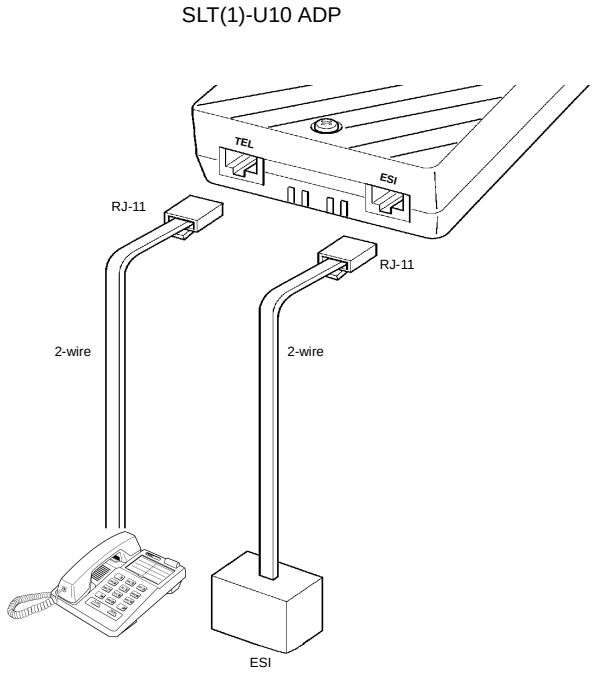
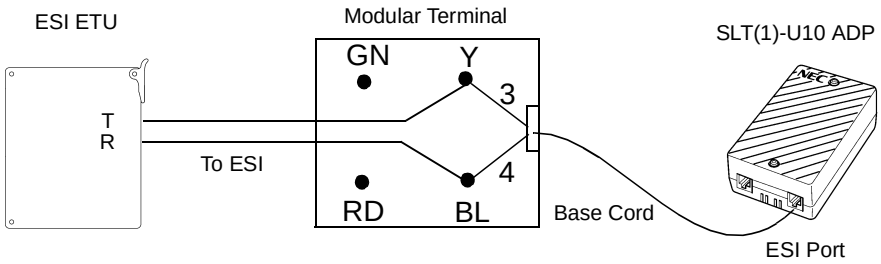
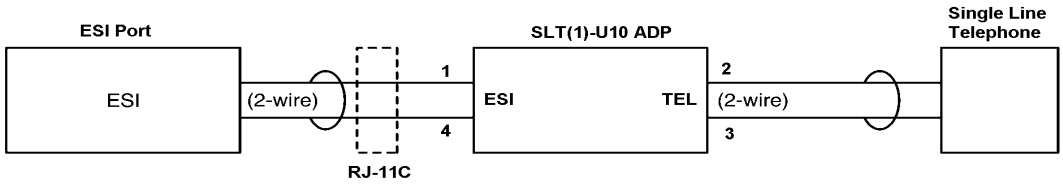


Figure 7-44 Connecting a Single Line Telephone to the System using an SLT(1)-U( ) ADP



Modular Terminal Connections



Single Line Telephone Connections

Figure 7-45 Connecting the SLT(1)-U( ) ADP

3.10.2 Wall Mounting the SLT(1)-U( ) ADP

1. Remove the two screws from the top to open the SLT Adapter as shown in Figure 7-46 Removing the Screws from the SLT(1)-U( ) ADP.

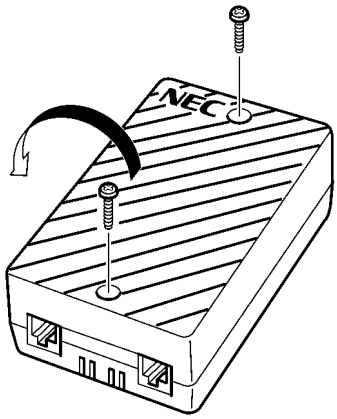


Figure 7-46 Removing the Screws from the SLT(1)-U( ) ADP

2. Using the two provided wood screws, attach the unit to the wall. Close the unit and secure with the two screws that were previously removed.

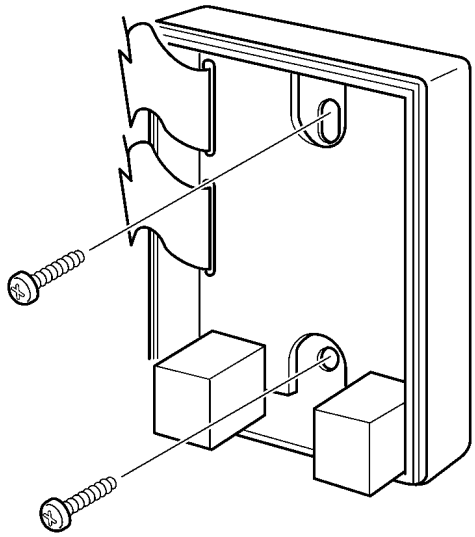


Figure 7-47 Attaching the SLT(1)-U( ) ADP to the Wall

3.11 VDD-U Unit (Voice/Data Unit for Digital Terminals)

This unit provides the station and LAN split for digital terminals. This adapter can be installed on any DTP or DTU Multiline Terminal except DTP-2DT-1 and DTP-16HC-1 connected to a VDH2(8)-U( ) ETU. It is used when LAN and telephone lines are incorporated into one cable.

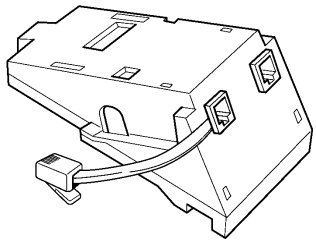


Figure 7-48 VDD-U Unit

3.11.1 Installing a VDD-U Unit on a Multiline Terminal

Refer to 3.5 CTA-U Unit (Computer Telephony Adapter). The instructions for installing these units are the same.

3.11.2 Connecting Cables to the VDD-U Unit

1. When the Multiline Terminal is already connected to the ESI(8)-U( ) ETU, unplug the telephone cord.

2. Plug the cable from the VDH2(8)-U( ) ETU and from the PC LAN board into the modular jacks on the VDD-U Unit. The jacks are labeled. Plug the cable from the VDD-U Unit into the modular jack on the Multiline Terminal.

   Limit the cable length from the VDH to the PC via the VDD to a maximum of 328 feet (100 meters).

   ☞ When LAN cables are reversed on the VDD-U Unit, the unit is not damaged, but the Multiline Terminal does not operate.

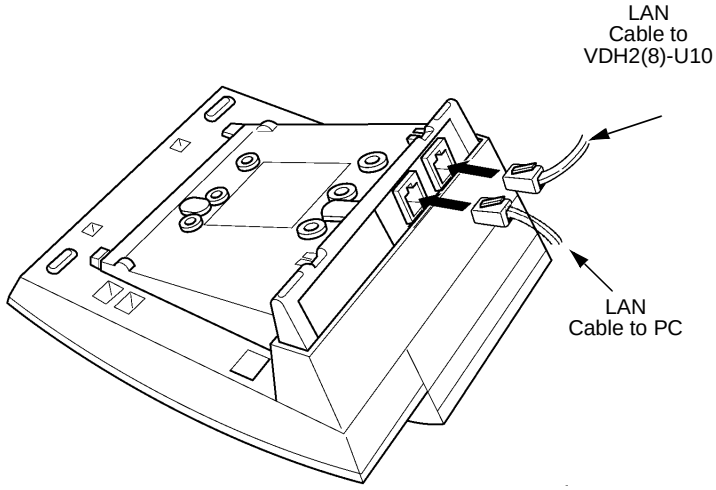


Figure 7-49 Connecting the Cables on the VDD-U Unit

3.12 Wall Mounting

Any Electra Elite Multiline Terminal can be wall mounted by using the base unit that comes with the Multiline Terminal or by using the WMU-U Unit to accommodate adapters that are installed on the Multiline Terminal.

3.12.1 Removing and Remounting the Handset Hanger

1. Remove the hanger by sliding it out of the slot.

2. Install it back in its original position so that the hanger protrudes providing a rest for the handset. (This procedure applies when using either the base unit or the WMU-U Unit.) Refer to Figure 7-50 Positioning the Handset Hanger for the steps for removing and remounting the handset hanger.

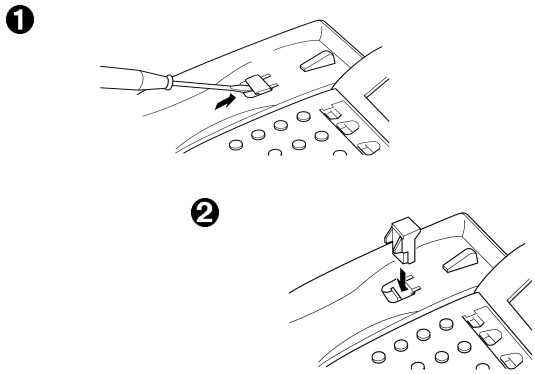


Figure 7-50 Positioning the Handset Hanger

3.12.2 Wall Mounting Using the Base Unit

1. Refer to Section 2 Preparing Multiline Terminal for Adapter Installation, and perform Steps 1~5.

2. Press both sides of the Base Cover, and turn it left to remove it.

3. Rotate base cover 180° and install it again on the Multiline Terminal.

4. Remove the shaded base plate knockout that is shown on Figure 7-51 Removing the Knockout.

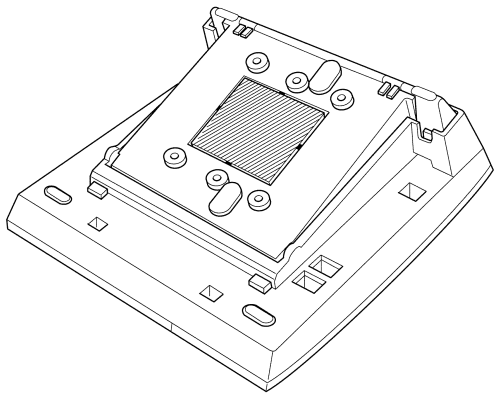


Figure 7-51 Removing the Knockout

5. Assemble the base plate and base cover.

6. As illustrated in Figure 7-52 Attaching the Base Plate to the Wall, attach the base plate and base cover assembly (wide end down) to the posts on the locally provided and installed wall plate. Place locally provided screws in the nodes on the base plate and secure the assembly to the wall.

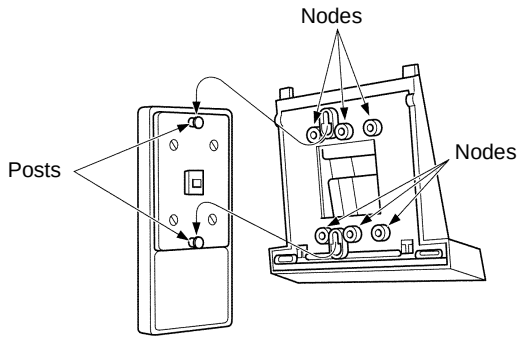


Figure 7-52 Attaching the Base Plate to the Wall

When using a modular jack instead of a wall plate, put the modular jack inside the base unit as shown in Figure 7-53 Wall Mounting Using a Modular Jack. Use the locally provided screws to attach the base unit directly to the wall.

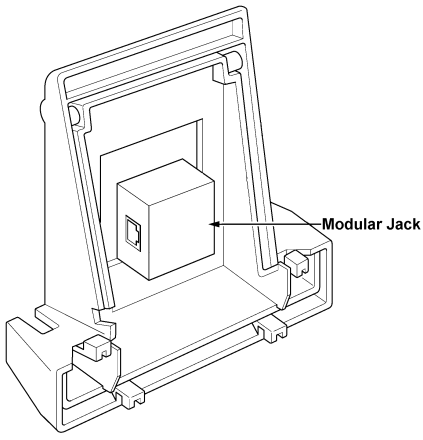


Figure 7-53 Wall Mounting Using a Modular Jack

7. Plug the line cord into the jack on the wall plate, wrap the extra cord and secure it with a tie wrap, and lead the line cord out through the groove in the side of the base unit.

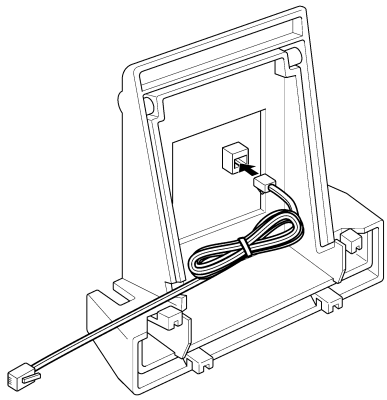


Figure 7-54 Plugging in the Line Cord Using a Wall Jack

When using a modular jack instead of a wall plate, plug the line cord into the modular jack, wrap the extra cord and secure it with a tie wrap, and lead the line cord out through the groove in the side of the base unit.

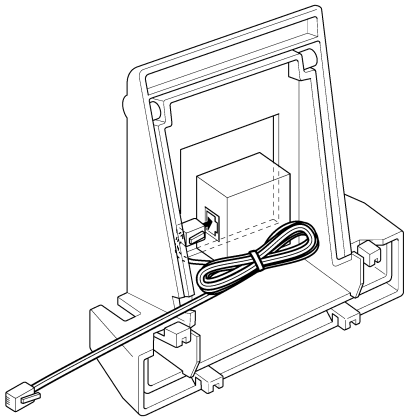


Figure 7-55 Plugging in the Line Cord Using a Modular Jack

8. With the base plate and base cover assembly attached to the wall, hook the two bottom tabs on the base cover into the tab slots on the base of the Multiline Terminal.

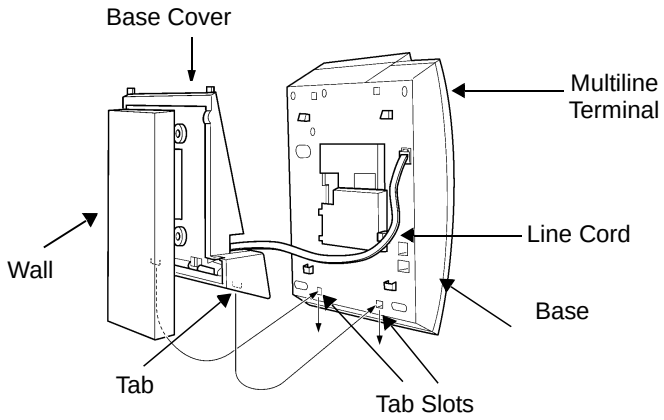


Figure 7-56 Attaching the Bottom Tabs of the Multiline Terminal to the Base Cover

9. Push up on the Multiline Terminal and lock the top tabs on the base cover into the tab slots on the base of the Multiline Terminal. Turn terminal slightly clockwise to interface with base cover. Figure 7-57 Attaching the Top Tabs of the Base to the Base Cover shows how the Multiline Terminal is attached.

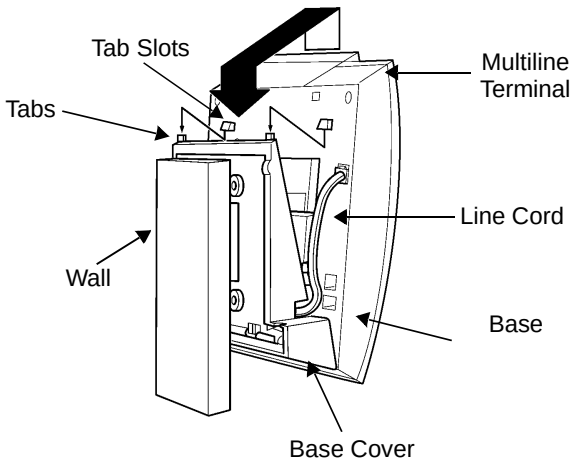


Figure 7-57 Attaching the Top Tabs of the Base to the Base Cover

10. When properly installed, the wall-mounted Multiline Terminal looks similar to the one shown in Figure 7-58 Installed Wall Mount Unit.

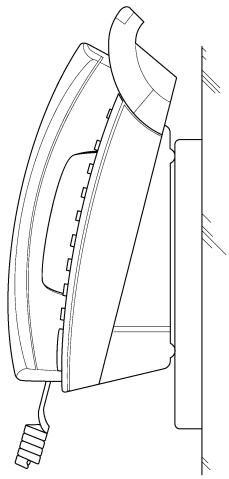


Figure 7-58 Installed Wall Mount Unit

☞ Do not adjust the tilt panel after the Multiline Terminal is mounted on the wall.

3.12.3 Installing the Wall Mount Unit and Mounting the Multiline Terminal Using the WMU-U Unit

When installing any adapter unit, a separate WMU-U Unit must be purchased to accommodate this unit.

1. Remove the line cord, base plate and base cover from the Multiline Terminal as shown in Section 2 Preparing Multiline Terminal for Adapter Installation in the previous section.

2. Cut off the tabs on the adapter as shown in Figure 7-59 Removing the Tabs from the Adapter.

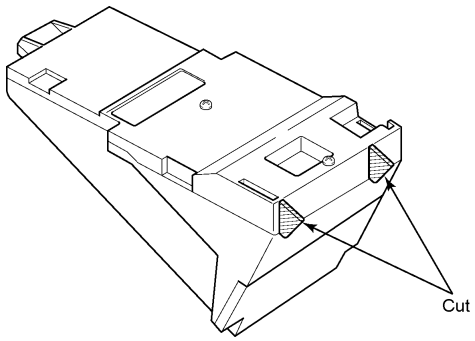
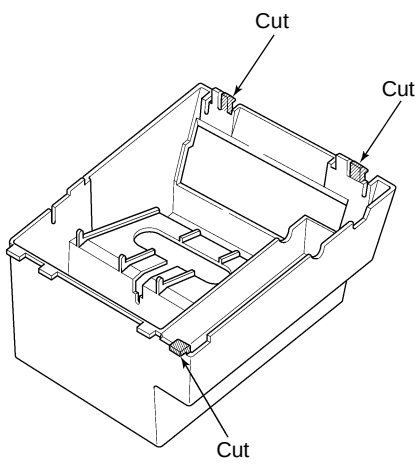
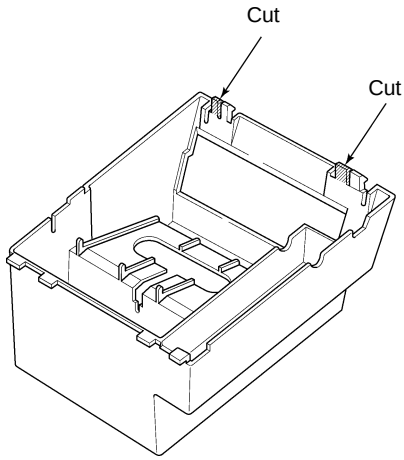


Figure 7-59 Removing the Tabs from the Adapter

3. Remove the tabs from the WMU-U Unit as shown in Figure 7-60 Removing the Tabs from the WMU-U Unit. (The tabs that are removed depends on the Multiline Terminal type.)



DTP/DTU-8-1 TEL
DTP-8D-1/DTU-8D-2 TEL
DTP/DTU-16-1 TEL
DTP-16D-1/DTU-16D-2 TEL
DCU-60-1 CONSOLE



DTP/DTU-32-1 TEL
DTP-32D-1/DTU-32D-2 TEL

Figure 7-60 Removing the Tabs from the WMU-U Unit

4. Bundle the cord from the modular jack leaving about eight inches. Use a tie wrap to secure the bundled cord.

5. Place the bundled line cord in the space between the WMU-U Unit and the wall. Lead the line cord out through the slits as shown in Figure 7-61 Leading the Line Cord Out of the WMU-U Unit.

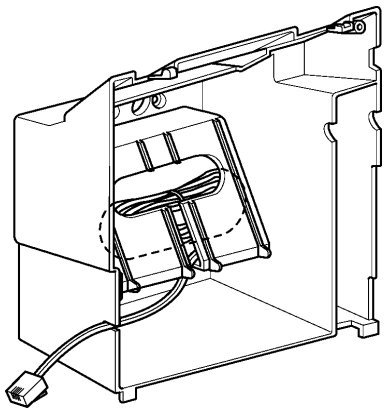


Figure 7-61 Leading the Line Cord Out of the WMU-U Unit

6. Attach the WMU-U Unit to the posts on the wall plate (locally provided). Place locally provided screws in the nodes on the WMU-U Unit and secure the WMU-U Unit to the wall.

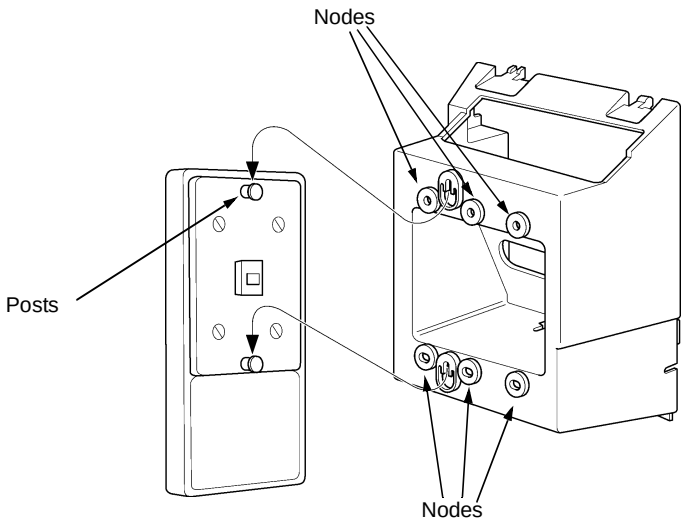


Figure 7-62 Attaching the Wall Mount Unit to the Wall

7. Connect the line cord to the Multiline Terminal.

8. With the WMU-U Unit attached to the wall, hook the two bottom tabs on the WMU-U Mount Unit in the tab slots on the Multiline Terminal. Then push the two top tabs on the WMU-U Unit in the tab slots on the Multiline Terminal. When the adapter has a power supply, lead the AC adapter cord out through the opening at the bottom of the Multiline Terminal. Refer to Figure 7-63 Attaching the Multiline Terminal to the WMU-U Unit.

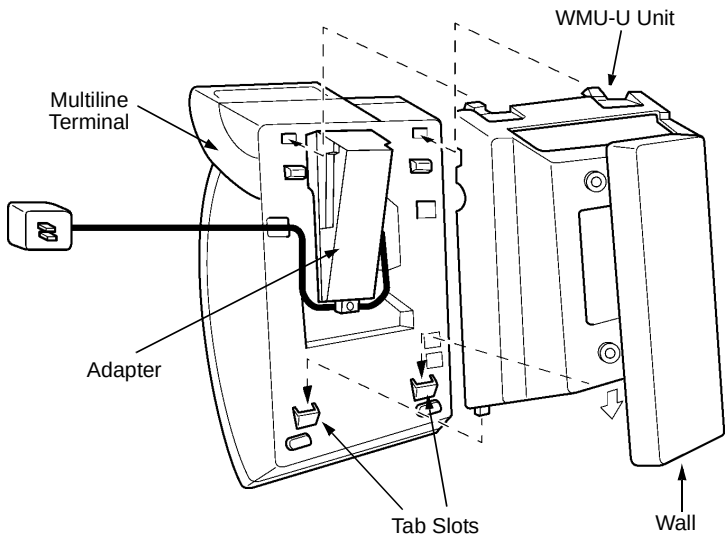


Figure 7-63 Attaching the Multiline Terminal to the WMU-U Unit

3.12.4 Removing the Multiline Terminal from the Base Cover

To remove the Multiline Terminal from the base cover, lift the Multiline Terminal to disengage top tabs, turn it slightly counter clockwise to unlock lower tabs on base cover, and remove it.

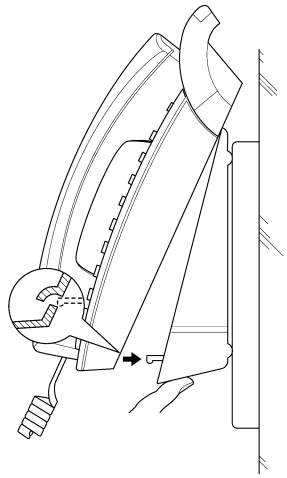


Figure 7-64 Removing the Multiline Terminal from the Base Cover

3.12.5 Removing the Multiline Terminal from the WMU-U Unit

To remove the Multiline Terminal from the WMU-U Unit, lift the Multiline Terminal to disengage top tabs and lower the terminal from the WMU-U Unit.

3.13 Music on Hold

The Electra Elite 48 KSU allows a Music on Hold source to be connected to the Electra Elite 48 system. Both internal and external music sources can be used. When an internal music source is used (digital music), external music on hold is not available.

3.13.1 Connecting Audio Sources to the KSU

Connect the plug end to the MOH IN jack on the MBD-U10 Unit in the KSU.

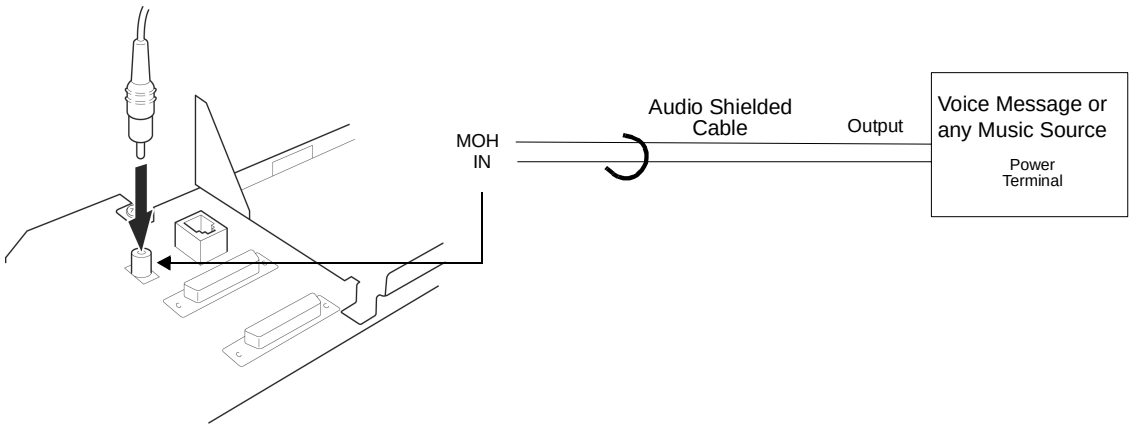


Figure 7-65 Music Source Connections

3.14 Station Background Music

Station Background Music can be provided using an internal or an external source. The same connection method used for Music on Hold is used for Station Background Music.

3.15 External Page Output

Electra Elite 48 KSU pins 25 and 50 are used to connect a single zone of paging. The ECR-U( ) ETU must be installed for External Tone Ringer, Background music over External Speakers, External Paging with more than one zone, or Night Chime. Refer to Figure 7-66 External Page Output.

For more information on the ECR-U( ) ETU, refer to Chapter 5, Section 7.4 ECR-U( ) ETU.

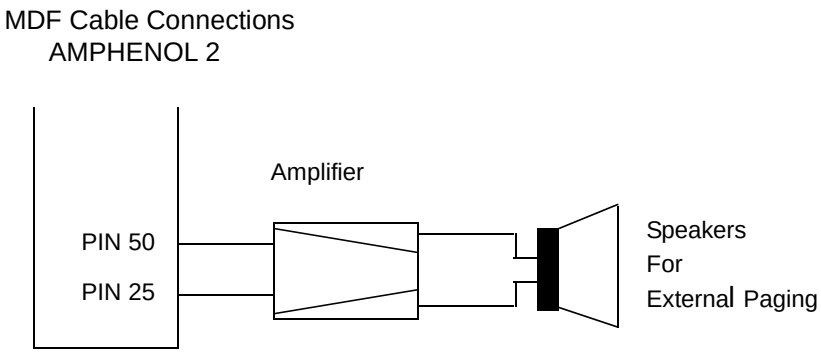


Figure 7-66 External Page Output

3.16 Connecting a KSU to a Personal Computer

To use Least Cost Routing (LCR), and PC Programming, specialized software must installed in the user PC and the PC must be connected via a serial port to the KSU.

3.16.1 Connecting the PC to the KSU

Using RS-232C straight cable, connect the PC to the COM1 port on the KSU MBD-U10 Unit. Refer to Figure 7-67 Connecting a PC to the KSU.

The functions and the communication port connections are:

Function	Port
PC Programming	COM 1
Wireless Programming	COM 1
Least Cost Routing (LCR)	COM 1
Station Message Detail Recording (SMDR)	COM 2

Serial-port characteristics include:

Characteristic	Value
Baud Rate	38.4 K (maximum)
Parity	None
Stop Bit	1 stop bit
Data Bit	8 bits
Port Type	DCE

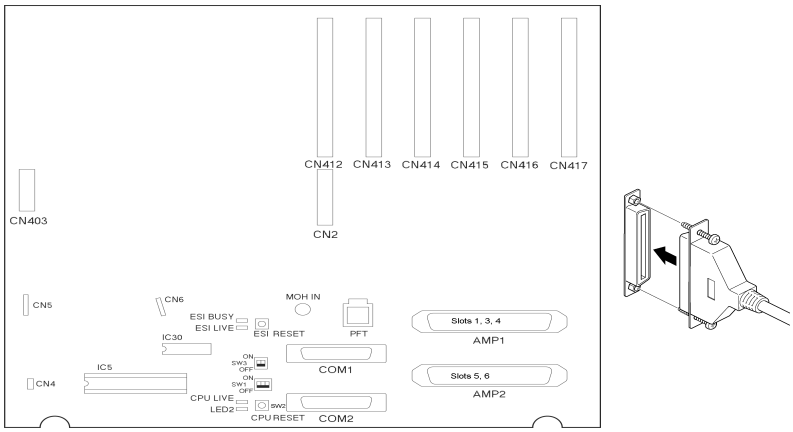


Figure 7-67 Connecting a PC to the KSU

3.16.2 Connecting the Printer to the KSU

When using the charge control ability, connect the printer to the KSU to allow the printing of the charge data. Connect the printer to the serial port on the side of the KSU with an RS-232C straight cable. Use the COM 2 port to connect the printer.

3.16.3 Remote Programming Using the Built-in Modem (Modem Kit Unit)

PC programming abilities include Remote Programming.

Connect the CO line to the modem extension number. The following characteristics apply to the built-in modem.

Characteristic	Value
Baud Rate	28.8Kbps Max
Parity	None
Stop Bit	1
Data Bit	8

☞ When using this program area to make changes, the application must be closed and started again to become effective.

3.17 *D*^{term} Voice Security Recorder

3.17.1 Description

The VSR Extension Recorder is a Universal Serial Bus (USB) device that taps across the digital extension pair of a *D*^{term} Digital extension port and includes software that enables the user to manage stored calls. VSR hardware connects in-line at the user desktop. Power is not required because the connection is a metallic wiring of the in and out connections. The recorder does nothing to affect operation of the Digital Telephone.

This device meets all applicable FCC and UL requirements for this type of communication device.

Figure 7-68 *D*^{term} Voice Security Recorder

3.17.2 Connectors

- One connector that allows USB cable connection to the PC USB connector to provide power and stream all speech and control channel information to the host PC and desktop software.
- Two digital telephone line connectors that passively tap across the connection between the Electra Elite IPK KSU and a DTH Digital Telephone to “listen” in high impedance mode to the signaling on the line.

3.17.3 Requirements for installation

The VSR is packaged with everything necessary for installation including:

- Software CD
- USB Cable
- Telephone connection lead
- Quick-start installation manual

3.17.4 Installation Procedures for Windows 98 or ME

1. Run the Setup.exe program file from the NEC installation CD **before** connecting the telephone interface unit to your PC.
2. Connect the VRS UBC interface connector to your PC using the provided USB cable.
3. Connect your telephone to either VSR port.
4. Connect the other VSR port to the telephone system, and recording is enabled.

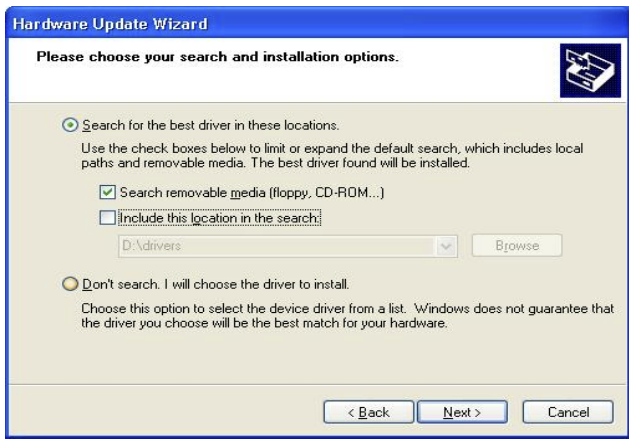
3.17.5 Installation procedure for Windows 2000 or XP

1. Using the provided USB cable, connect the VRS USB interface to your PC.
2. Windows automatically detects the new hardware and displays a Wizard dialog box.

3. Select Install from a list or specific location (Advanced), and select Next.

Hardware Update Wizard
Welcome to the Hardware Update Wizard
This wizard helps you install software for:
USB Device
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

4. The next screen is displayed:


Hardware Update Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
D:\drivers
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

5. When files are downloaded from the Internet, uncheck *Search Removable Media*, and check *Include this location in the search,* and enter the location where the downloaded files are to be stored (*e.g.*, C:\My Documents).

6. Select Next and the next screen is displayed.

Hardware Installation
The software you are installing for this hardware:
Dterm-Recorder-USB-Interface
has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

7. The software is fully tested , but has not been sent to Microsoft for approval. Select Continue Anyway and the next screen is displayed.

8. The necessary device drivers are installed.

9. Select Finish to close the dialogue.

10. Now run Setup.exe on your NEC installation CD to install necessary application software on your PC.

11. Connect a telephone to the VSR ports, and you can record.

    ☞ Ports are interchangeable between a Multiline Terminal and Electra Elite System.

3.17.6 VSR Application Software

The VSR software is delivered on a Compact Disk using a self-starting install shield. The CD contains all applicable files and installation procedures to operate to this specification, including USB device drivers, software application, and Help files.

A quick-start instruction sheet and a pre-recorded user guide that steps the user through the various options are provided.

The VSR application supports Microsoft Operating Systems that support USB devices. The following systems meet this requirement:

- ✆ WIN 98SE
- ✆ WIN Millennium Edition (ME)
- ✆ WIN 2000
- ✆ WIN XP (all variants)

  ☞ VRS does not support WIN 95 and below, or WIN NT.

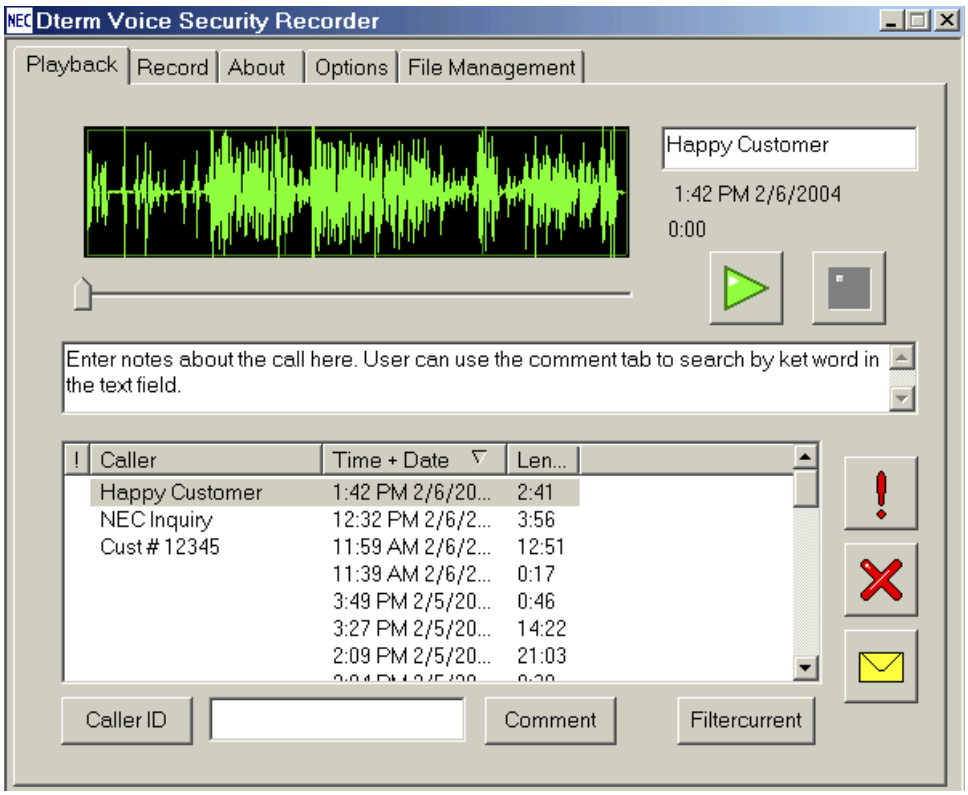
3.17.7 VRS User Interface Tab Options

VRS has the following tabs to allow the user to select features and options:

- ✆ Playback allows various playback features of recorded conversations.
- ✆ Record allows control of recording.
- ✆ About provides software version information.
- ✆ Options to set-up controls such as recording format.
- ✆ File Management allows the user to manage disk space used by the VSR.

3.17.8 VSR Playback Tab

This Tab allows the user to list and play recorded conversations. A graphical presentation of the volume level of the call with a cursor to indicate the current playback position is displayed. The cursor can be dragged forward or backward to allow rapid selection of the applicable section.



The user can edit the Caller ID or the Comments field when viewing an existing recording.

☞ Caller ID and number dialed are not available on the first release. Check with NEC for release date.

The user can list recordings in order of importance (using exclamation mark) with Caller ID, Time + Date, or duration.

The Caller ID and Comment buttons allow the user to filter out all recordings with the required Caller ID or text in the Comments field.

Playback, pause and stop buttons allow the user to control the Playback.

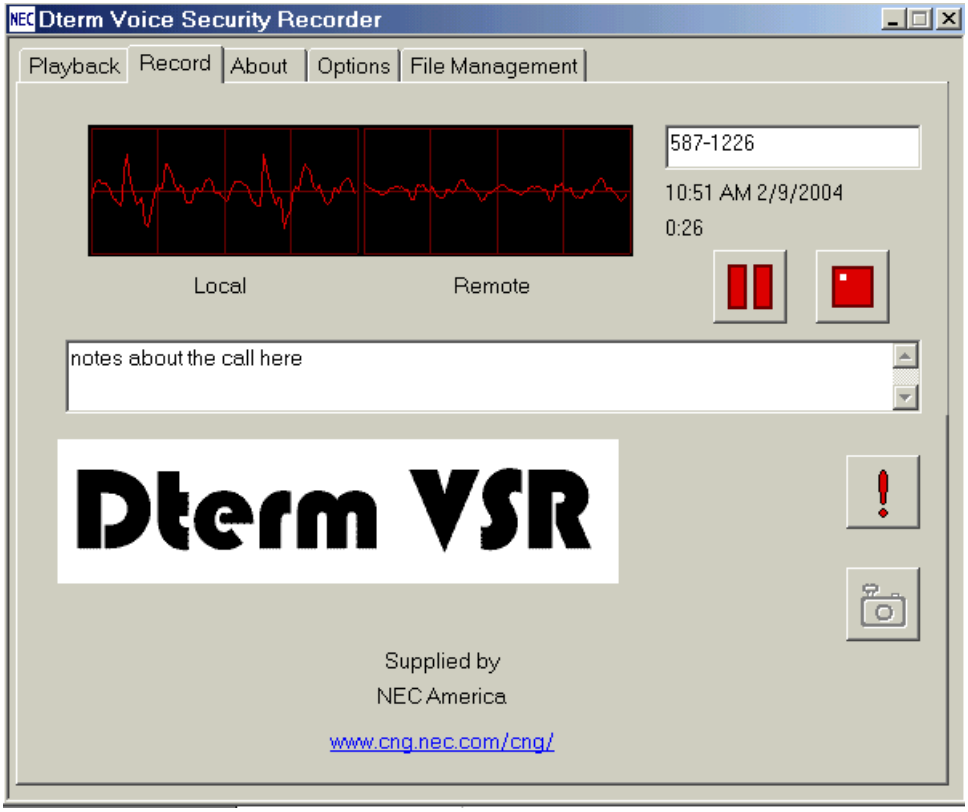
The Red exclamation mark allows recording to be identified as important for future listing or ensures that the recording cannot be overwritten.

The Red X allows recordings to be manually deleted.

The envelope button generates an e-mail with the recording inserted for mailing to a colleague.

3.17.9 VRS Record Tab

This Tab allows the user to view recording levels and control the recording.



The Oscilloscope shows the local and remote levels on the line separately (Microphone is the user level and speaker is the distant party level.

The Caller ID field is for future versions, but information can be entered or overwritten by the user.

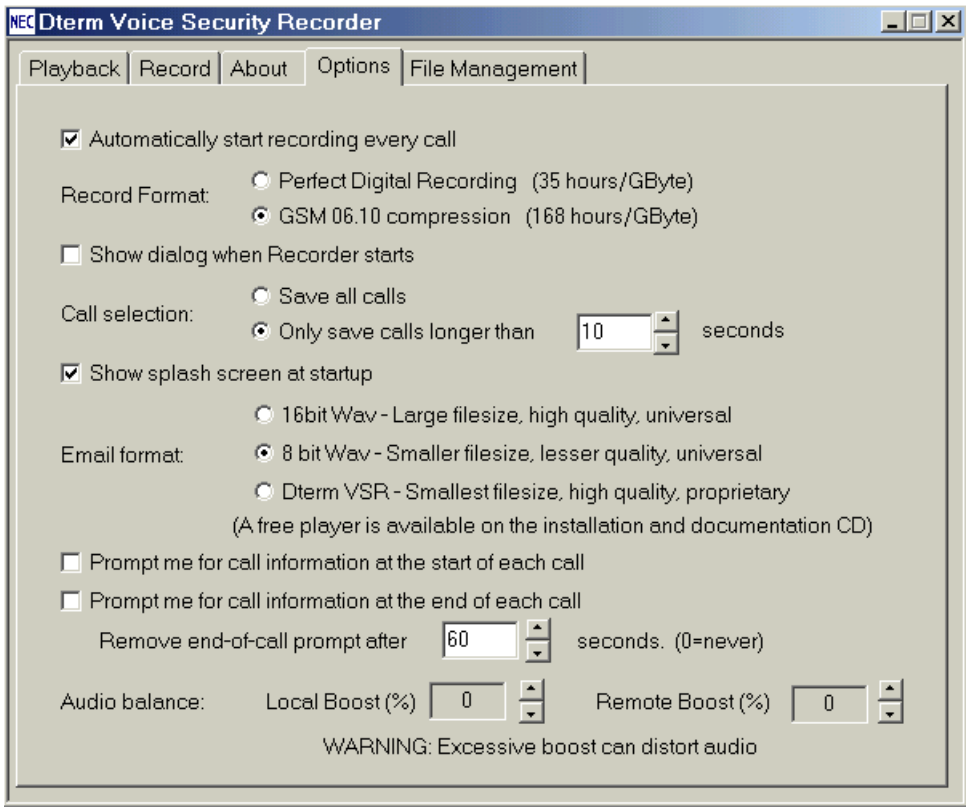
Manual Start, Stop, and Pause buttons control the recording status.

The user can add notes and mark important recordings with an exclamation point to avoid deleting the conversation.

The camera button allows a user to snapshot record conversation to the current point while continuing to record the entire conversation. This feature is important for emergency centers where an operator can replay an important part while continuing to record.

3.17.10 Options Tab

This Tab allows the user to select various setup options of the VSR.


Dterm Voice Security Recorder
Playback
Record
About
Options
File Management
Automatically start recording every call
Record Format:
Perfect Digital Recording (35 hours/GByte)
GSM 06.10 compression (168 hours/GByte)
Show dialog when Recorder starts
Call selection:
Save all calls
Only save calls longer than
10
seconds
Show splash screen at startup
Email format:
16bit Wav - Large filesize, high quality, universal
8 bit Wav - Smaller filesize, lesser quality, universal
Dterm VSR - Smallest filesize, high quality, proprietary
(A free player is available on the installation and documentation CD)
Prompt me for call information at the start of each call
Prompt me for call information at the end of each call
Remove end-of-call prompt after
60
seconds. (0=never)
Audio balance:
Local Boost (%)
0
Remote Boost (%)
0
WARNING: Excessive boost can distort audio

- ✆ Automatically start recording every call

  Starts the recording when a call, including internal extension calls, is made.

- ✆ Recorded format

Perfect Digital Recording stores the recording in PCM format directly from the digital line. However, the highest quality requires significant space (35 hours per Gbyte) on the PC disk.

GSM 06.10 uses a compression technique to store 168 Hours per Gbyte. The quality difference is negligible, so this becomes the default selection.

- Show dialog when Recorder starts

  Selecting this default option brings the Record Tab to the front of the user screen when record is activated.

- Call Selection

  Saves all calls or only those that exceed an established limit.

- Show splash screen at startup

  When selected, the VSR logo is shown for five seconds when the application is started.

- Email format

  Allows the user to select the type of file inserted in an e-mail when the user selects the e-mail button on the Playback Tab to send the VSR format to other users that have this application or to convert it to a .wav format for replay by any PC.

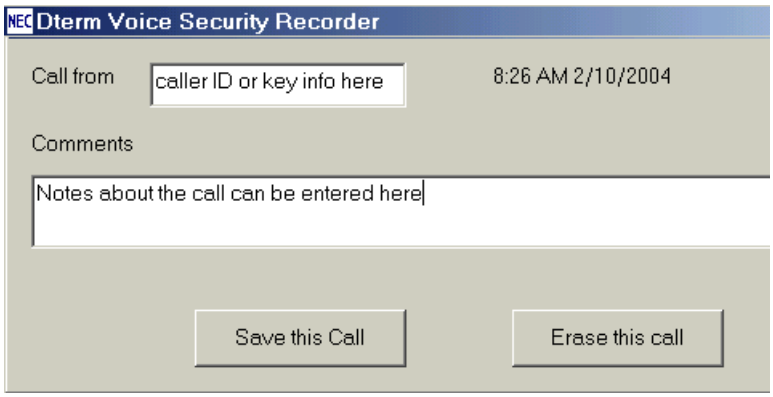
  D^{term} VSR selection automatically adds the Caller ID, time, date, and comments fields to any e-mail.

- Prompt for call information at the start of each call

  When selected, the Record screen is displayed when a call is made to allow the user to enter information.

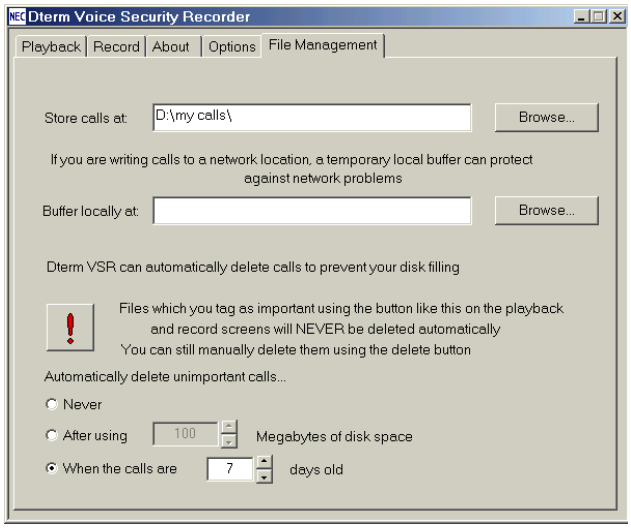
✆ Prompt for call information at the end of each call

When selected, a screen is shown to allow the user to manage calls at completion. The user can save or erase the call, add notes, or mark important calls using the red **!**.



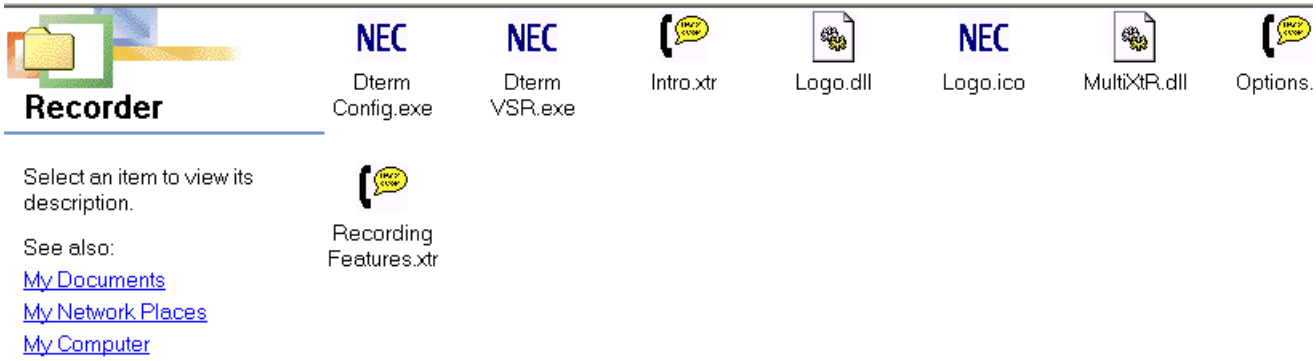
3.17.11 File Management Tab

File management is necessary when the user makes many telephone calls and stores each conversation. The selections are self-explanatory.


Dterm Voice Security Recorder
Playback
Record
About
Options
File Management
Store calls at:
D:\my calls\
Browse...
If you are writing calls to a network location, a temporary local buffer can protect against network problems
Buffer locally at:
Browse...
Dterm VSR can automatically delete calls to prevent your disk filling
Files which you tag as important using the button like this on the playback and record screens will NEVER be deleted automatically
You can still manually delete them using the delete button
Automatically delete unimportant calls...
Never
After using
100
Megabytes of disk space
When the calls are
7
days old

3.17.12 Custom Program Settings

Comvurgent provides the dealer or user the option of making additional adjustments.



This special configuration program can only be accessed by browsing to the installation location (default C:\Program Files\Comvurgent\XtRecorder), and then click on the NEC Dterm Config.exe.

☞ The customer takes all responsibility to ensure they meet legal requirements Comvurgent provides the user option settings to meet customer demands and cannot be responsible for misapplication of the product.

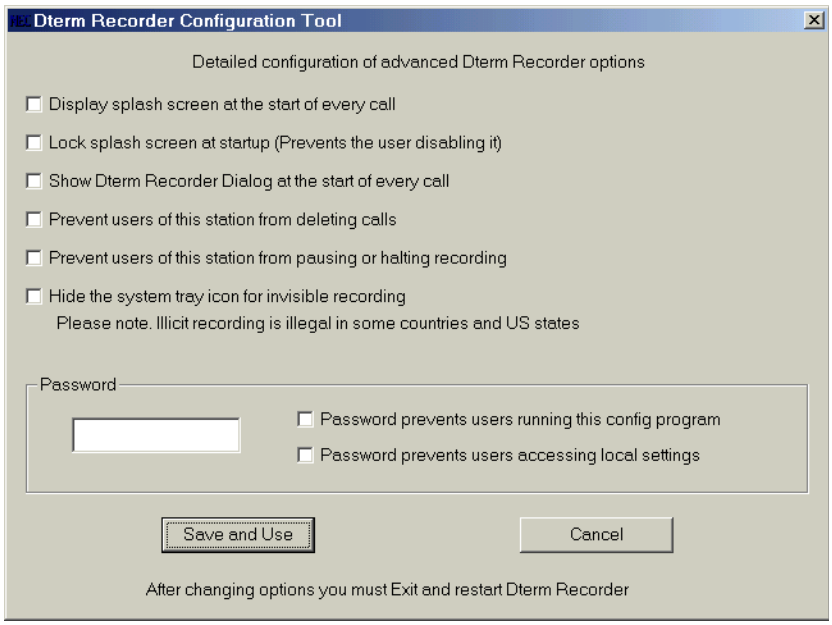
Several settings can be customized to meet requirements of the application.

✆ Display splash screen at the start of every call

Reminds the user that recording is taking place by splashing a screen with every call.

✆ Show Dterm Recorder dialog at the start of every call

Displays the application record screen anytime a call is being recorded.


Dterm Recorder Configuration Tool
Detailed configuration of advanced Dterm Recorder options
Display splash screen at the start of every call
Lock splash screen at startup (Prevents the user disabling it)
Show Dterm Recorder Dialog at the start of every call
Prevent users of this station from deleting calls
Prevent users of this station from pausing or halting recording
Hide the system tray icon for invisible recording
Please note. Illicit recording is illegal in some countries and US states
Password
Password prevents users running this config program
Password prevents users accessing local settings
Save and Use
Cancel
After changing options you must Exit and restart Dterm Recorder

- Prevents users of this station from deleting calls
- Disables the delete key.
- Prevents users of this station from pausing or halting recording
- Disables pause and stop controls.
- Hide the system tray icon for invisible recording
- Hides the small icon that appears in the system tray and flashes blue when recording.
- Password

  Locks access to these settings and those at the user level.

  ☞ When using this program area to make changes, the application must be closed and started again to become effective.

Installing Electra Elite IPK and D^term Series i Equipment

CHAPTER 8

SECTION 1 GENERAL INFORMATION

The Electra Elite 48 system supports the Electra Elite IPK and D^term Series i Multiline Terminals, an Attendant Console, and several adapters that allow peripheral equipment to be attached to the Multiline Terminals. This chapter describes each terminal, console, and adapter and provides applicable installation instructions.

SECTION 2 MULTILINE TERMINALS

2.1 DTR-2DT-1 TEL

This digital Multiline Terminal has two programmable line keys (each with a 2-color LED), nine function keys, a built-in speakerphone, a Large LED to indicate incoming calls and messages, and a data jack to connect analog SLT.

Optional adapters cannot be installed in this terminal.

A maximum of 31 DTR-2DT-1 TELs can be installed in the Electra Elite 48 system.

Figure 8-1 DTR-2DT-1 TEL Multiline Terminal

2.2 DTH/DTR-8-1 TEL

The DTH (for Electra Elite IPK) or DTR (for D^{term} Series i) digital non-display Multiline Terminal has eight programmable line keys (each with a 2-color LED), a built-in speakerphone, headset jack, a large LED to indicate incoming calls and messages, and compatibility with AD(A)-R, AP(A)-R, AP(R)-R, or CT(A)-R Unit.

A Directory button is provided to perform scrolling for Caller ID, and a Message button is provided to directly access voice mail.

A maximum of 31 DTH/DTR-8-1 terminals can be installed in the Electra Elite 48 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in an Electra Elite 48 system is 32.

Figure 8-2 DTH/DTR-8-1 TEL Multiline Terminal

2.3 DTH/DTR-8D-1 TEL

The DTH (for Electra Elite IPK) or DTR (for D^{term} Series i) digital Multiline Terminal has eight programmable line keys (each with the 2-color LED), a built-in speakerphone, headset jack, a Large LED to indicate incoming calls and messages, and compatibility with AD(A)-R, AP(A)-R, AP(R)-R, or CT(A)-R Unit.

A Directory button is provided to perform scrolling for Caller ID, and a Message button is provided to directly access voice mail.

This terminal also has a 3-line, 24-character, adjustable Liquid Crystal Display (LCD) and four softkeys.

A maximum of 32 DTH/DTR-8D-1 terminals can be installed in the Electra Elite 48 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in the Electra Elite 48 system is 32.

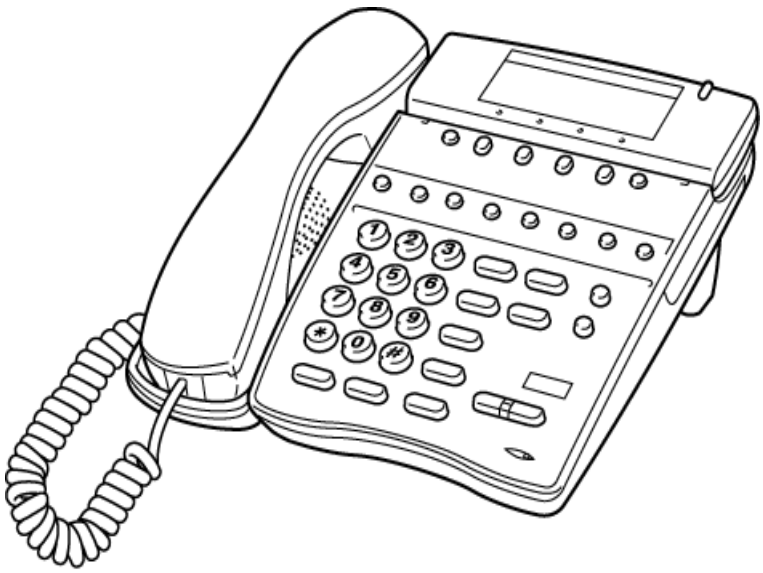


Figure 8-3 DTH/DTR-8D-1 TEL Multiline Terminal

2.4 DTH/DTR-16D-1 TEL

The DTH (for Electra Elite IPK) or DTR (for D^{term} Series i) digital Multiline Terminal has 16 programmable line keys (each with a 2-color LED), a built-in speakerphone, headset jack, a large LED to indicate incoming calls and messages, and compatibility with AD(A)-R, AP(A)-R, AP(R)-R, or CT(A)-R Unit.

A Directory button is provided to perform scrolling for Caller ID, and a Message button is provided to directly access voice mail.

This terminal also has a 3-line, 24-character, adjustable Liquid Crystal Display (LCD) and four softkeys.

A maximum of 32 DTH/DTR-16D-1 terminals can be installed in an Electra Elite 48 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in an Electra Elite 48 system is 32.

Figure 8-4 DTH/DTR-16D-1 TEL Multiline Terminal

2.5 DTH/DTR-32D-1 TEL

The DTH (for Electra Elite IPK) or DTR (for D^{term} Series i) digital Multiline Terminal has 16 programmable line keys (each with a 2-color LED), 16 one-touch keys, a built-in speakerphone, headset jack, a large LED to indicate incoming calls and messages, and compatibility with AD(A)-R, AP(A)-R, AP(R)-R, or CT(A)-R Unit.

A Directory button is provided to perform scrolling for Caller ID, and a Message button is provided to directly access voice mail.

This terminal also has a 3-line, 24-character, adjustable Liquid Crystal Display (LCD) and four softkeys.

System software can be changed so this Multiline Terminal can have 24 programmable line keys and eight one-touch keys.

A maximum of 32 DTH/DTR-32D-1 terminals can be installed in an Electra Elite 48 system.

The combined total of all Electra Elite Multiline Terminals that can be installed in an Electra Elite 48 system is 32.

Figure 8-5 DTH/DTR-32D-1 TEL Multiline Terminal

2.6 DCR-60-1 CONSOLE

The Attendant Console has 60 programmable line keys (each with a 2-color LED) that can be programmed as Direct Station Selection keys, function keys, or as outside line keys. An external power supply (AC adapter) is provided with the Attendant Console.

A maximum of four DCR-60-1 Consoles can be installed in an Electra Elite 48 system. An Attendant Position can have four DCR-60-1 Consoles associated with it.

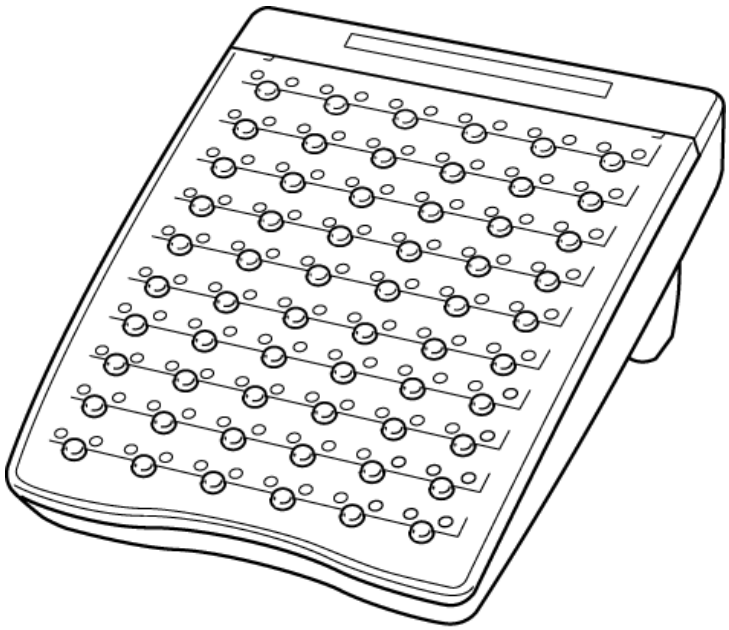


Figure 8-6 DCR-60-1 Console

SECTION 3
SINGLE LINE TELEPHONES

3.1 DTR-1-1 TEL

The Single Line Telephone is a fully modular terminal with a Flash key, redial key, 6-level receive volume control, 4-level ring volume control, 3-tone ring pitch, data jack, and message waiting lamp. Each terminal requires an SLT(1)-U10 ADP or SLI(4)/(8)-U10 ETU.

A maximum of 24 DTR-1-1 TELs can be installed in an Electra Elite 48 system.

Figure 8-7 DTR-1-1 TEL Single Line Telephone

☞ The H switch setting for the receive volume control should only be used by hearing impaired individuals, otherwise hearing damage may occur. This telephone complies with HAC (Hearing Aid Compatible) volume control defined by section 68.317 of the FCC Rules and Regulations, 1996 edition.

3.2 DTR-1HM-1 TEL

The Single Line Telephone is a fully modular terminal with a flash key, Redial key, Speaker key, Hold key, 6-level receive and speaker volume control, 4-level ring volume control, 3-tone ring pitch, data jack, message waiting lamp, and eight programmable Feature Access/Speed Dial keys. Each terminal requires an SLT(1)-U10 ADP or SLI(4)/(8)-U10 ETU.

A maximum of 24 DTR-1HM-1 TELs can be installed in an Electra Elite 48 system.

Figure 8-8 DTR-1HM-1 TEL Single Line Telephone

☞ The H switch setting for the receive volume control should only be used by hearing impaired individuals, otherwise hearing damage may occur. This telephone complies with HAC (Hearing Aid Compatible) volume control defined by section 68.317 of the FCC Rules and Regulations, 1996 edition.

SECTION 4
CONNECTING DTH/ DTR TO THE SYSTEM

To connect a DTH/DTR Multiline Terminal Multiline to the system proceed as follows:

1. Plug the telephone cord in the modular jack on the bottom side of the Multiline Terminal. The handset is also attached to the bottom side of the Multiline Terminal.

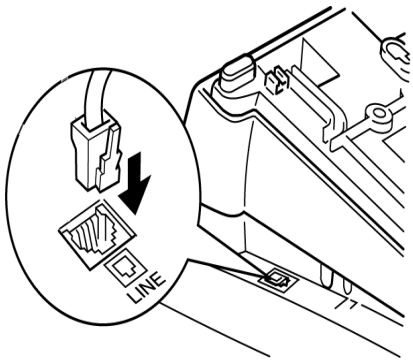


Figure 8-9 Connecting a DTH/DTR Terminal to the System

2. Attach the telephone cord through the groove shown on Figure 8-10 Leading Line Cord on a DTH/DTR Terminal.

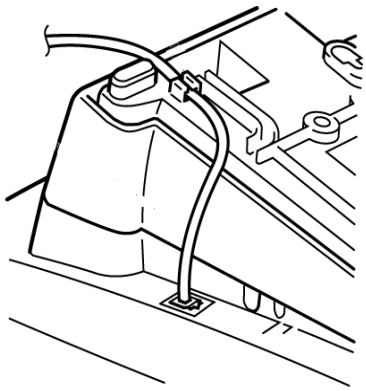


Figure 8-10 Leading Line Cord on a DTH/DTR Terminal

SECTION 5 CONNECTING DCR ATTENDANT CONSOLE TO A MULTILINE TERMINAL

An Attendant Console can be attached to a Multiline Terminal using the following procedures.

1. Turn the Multiline Terminal and the Attendant Console face down.

2. Using the joining plate provided with the Attendant Console, attach the plate to the Multiline Terminal and the Attendant Console. Refer to Figure 8-11 Joining DCR Console to a Terminal.

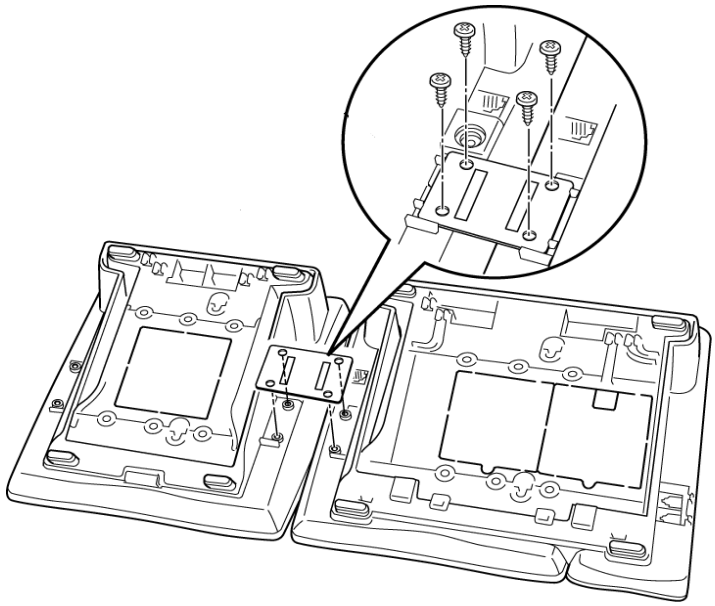


Figure 8-11 Joining DCR Console to a Terminal

3. Connect the line cord and the AC adapter to the indicated locations on the bottom of the Attendant Console. Refer to Figure 8-12 Connecting the Line Cord and AC Adapter When Installing a DCR Attendant Console.

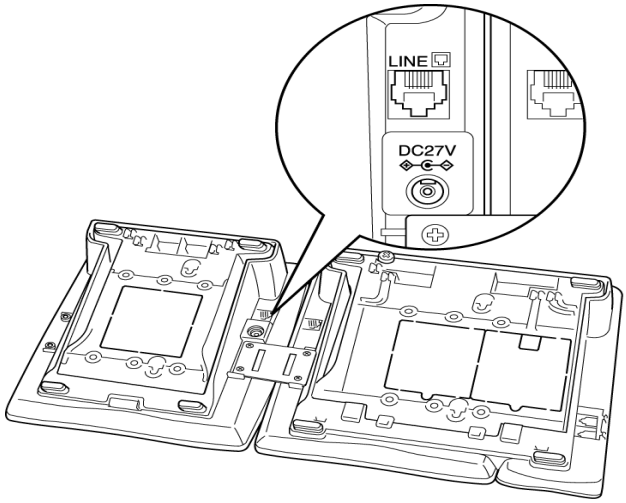


Figure 8-12 Connecting the Line Cord and AC Adapter When Installing a DCR Attendant Console

4. When the Attendant Console and the Multiline Terminal are properly connected, they sit side-by-side as shown in Figure 8-13 DCR Attendant Console and Multiline Terminal.

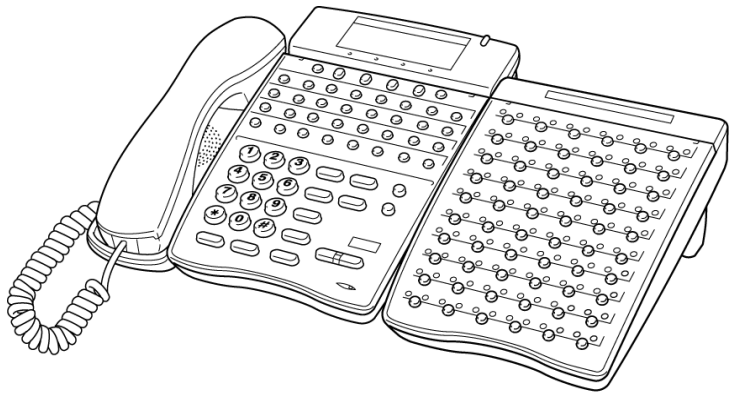


Figure 8-13 DCR Attendant Console and Multiline Terminal

☞ Ensure that the AC adapter, supplied with the Attendant Console, is used. Using a different AC adapter may cause problems. Check that the supplied voltage matches that of the adapter and plug it in an outlet.

SECTION 6 ADJUSTING THE DTH/ DTR LCD

DTH/DTR display Multiline Terminals have an adjustable Liquid Crystal Display (LCD). The LCD can be adjusted by pushing downward or upward as desired.

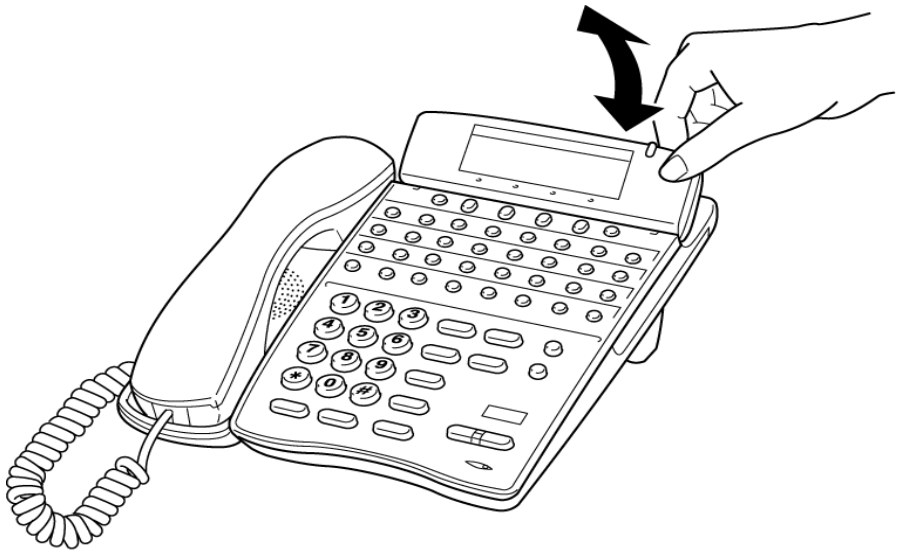


Figure 8-14 Adjusting the DTH/DTR LCD

SECTION 7 INSTALLING DTH/ DTR LINE CARDS AND PLASTIC PANELS

Line key designations are entered on the Line Card that is then placed on the Multiline Terminal to provide a quick reference of key designations. The Line Card can be changed as necessary. The Plastic Panel is placed on top of the Line Card to hold it in place.

1. Remove the Line Panel. Refer to Figure 8-15 Removing the Line Panel.

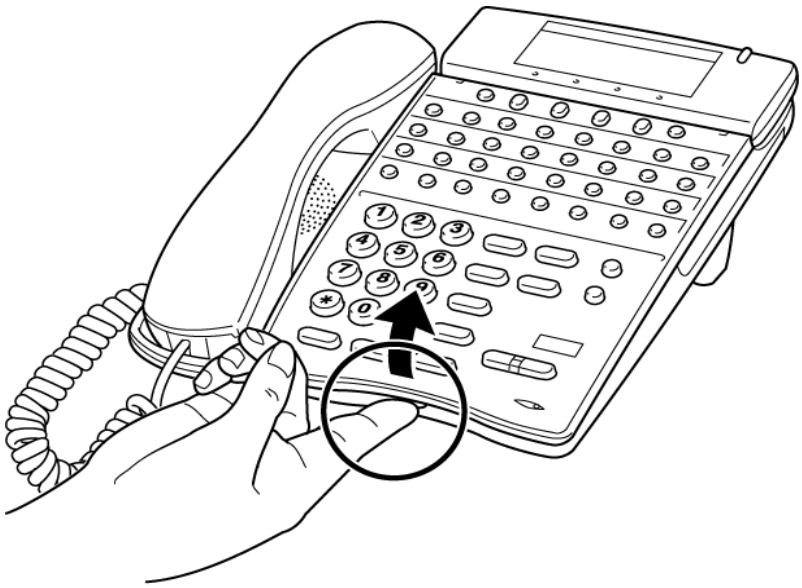


Figure 8-15 Removing the Line Panel

2. Place the Line Card over the keys on the Multiline Terminal.

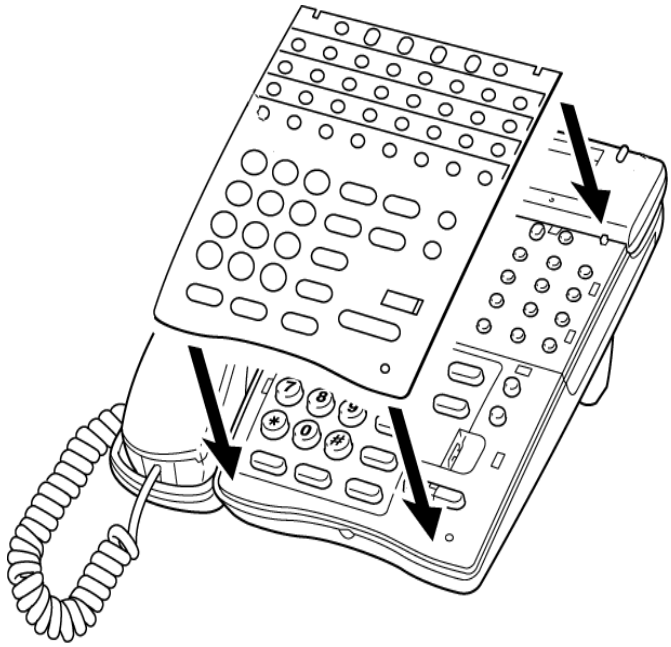


Figure 8-16 Placing Line Card on the Line Panel

3. Install the plastic panel over the line card and push the corners of the Plastic panel until they click in place. Refer to Figure 8-17 Installing Plastic Panel on DTH/DTR Multiline Terminal.

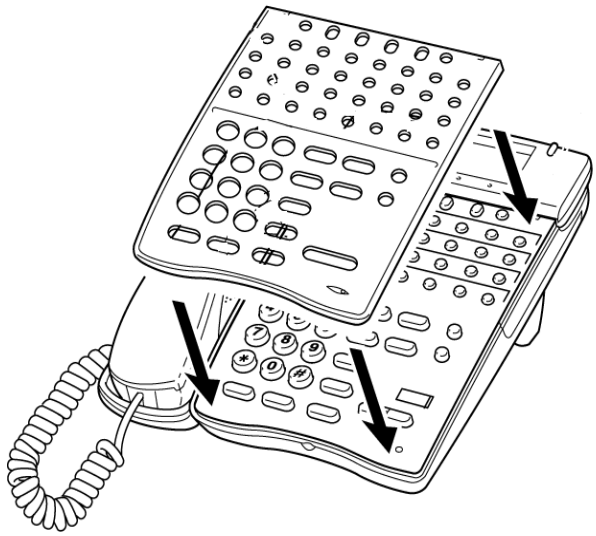


Figure 8-17 Installing Plastic Panel on DTH/DTR Multiline Terminal

SECTION 8 ADJUSTING DTH/DTR MULTILINE TERMINAL HEIGHT

The base plate on DTH/DTR Multiline Terminals is hinged. The bottom part can be adjusted to raise or lower the terminal height.

1. Turn the Multiline Terminal upside down, grasp as shown in Figure 8-18 Raising DTH/DTR Multiline Terminal Height, and pull up until the Base Cover latches click.

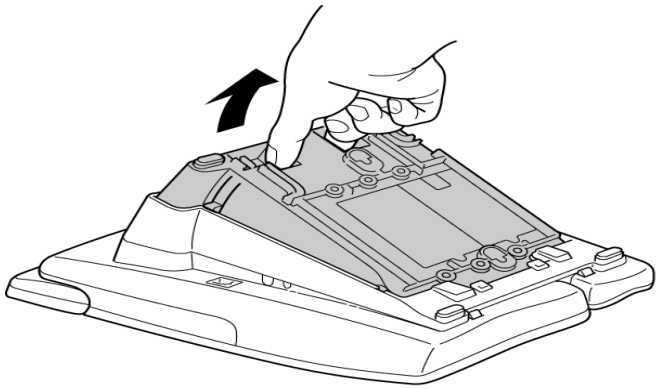


Figure 8-18 Raising DTH/DTR Multiline Terminal Height

2. To lower the Base Cover, press the indicated left and right tabs inward and press down. Refer to Figure 8-19 Lowering the Base Cover on the Multiline Terminal.

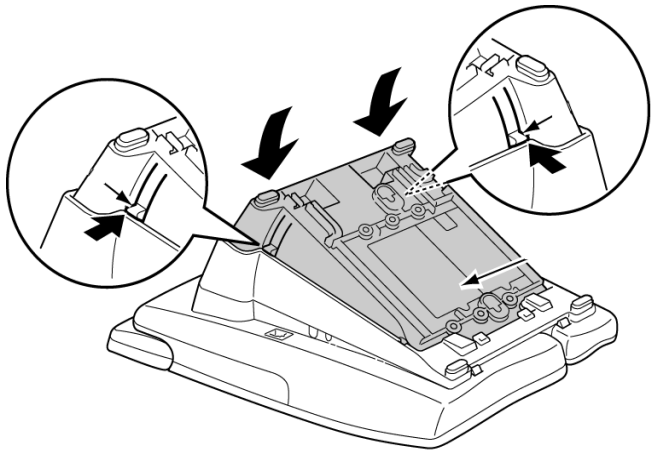


Figure 8-19 Lowering the Base Cover on the Multiline Terminal

SECTION 9 REMOVING OR INSTALLING THE BASE COVER

To remove the Base Cover proceed as follows:

1. Extend the Base Cover.

2. Press tabs shown on Figure 8-20 Removing Base Cover, and slide the Base Cover in the arrow direction until it clicks.

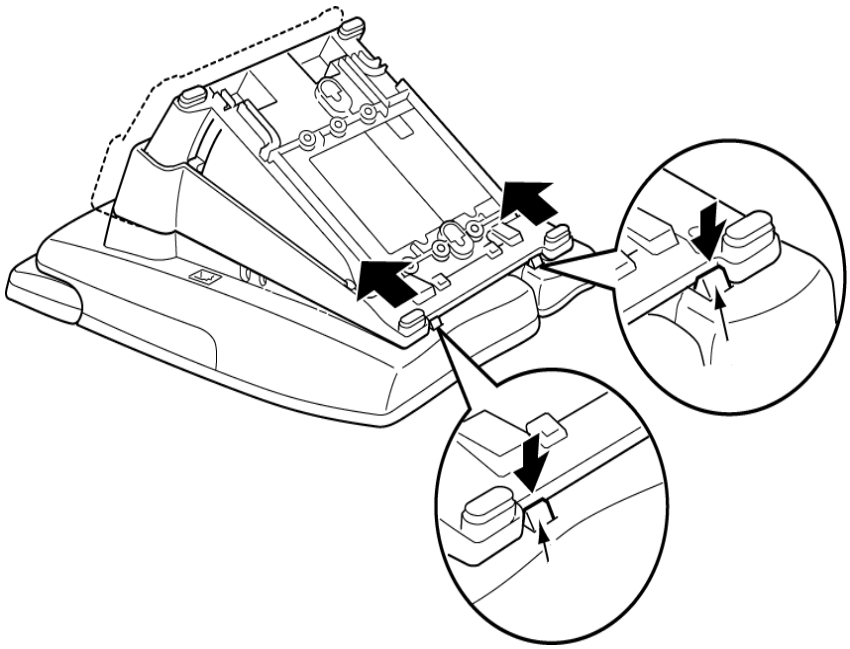


Figure 8-20 Removing Base Cover

To install the Base Cover, place the four tabs in their applicable slots, and pull the cover in the direction of the arrows until it clicks in place.

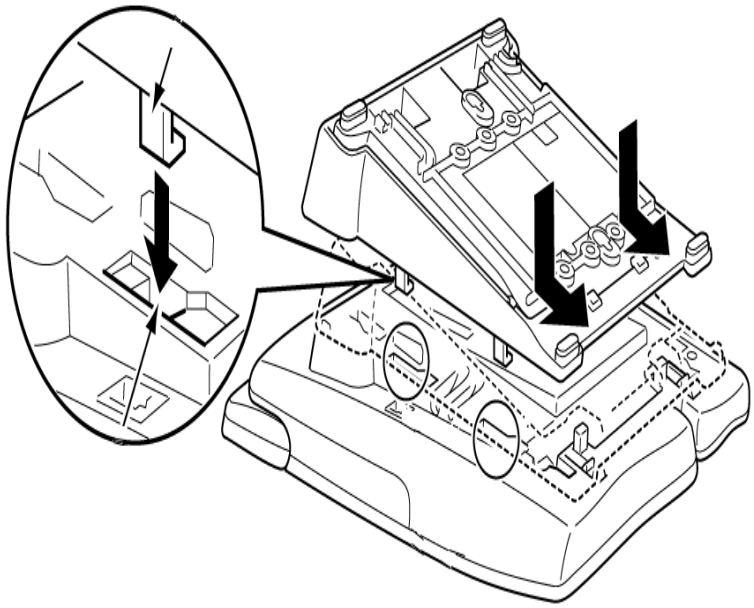


Figure 8-21 Installing Base Cover

SECTION 10 INSTALLING ABBREVIATED DIALING TABLE

Assemble the abbreviated dialing table as shown in Figure 8-22 Assembling the Abbreviated Dialing Table.

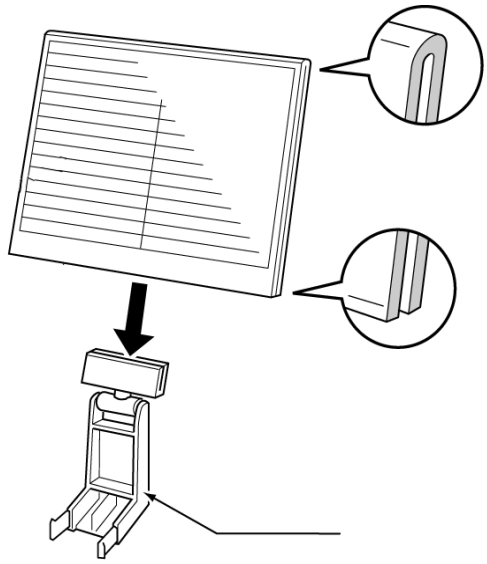


Figure 8-22 Assembling the Abbreviated Dialing Table

Install abbreviated dialing table on the terminal as shown in Figure 8-23 Installing Abbreviated Dialing Table on the Terminal.

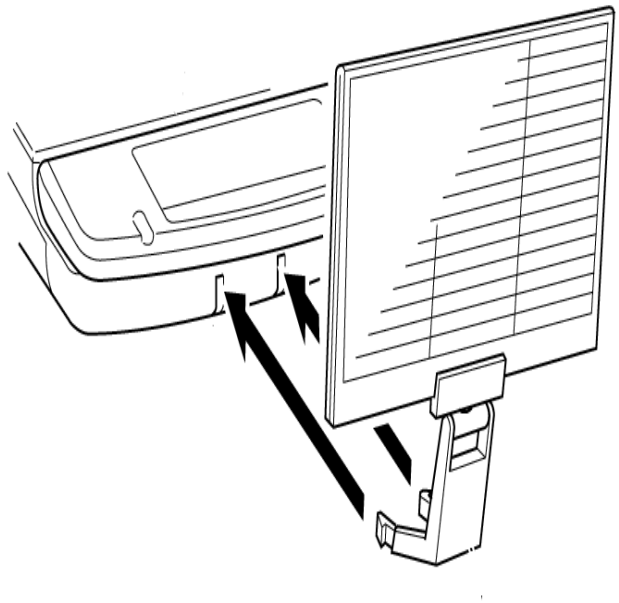


Figure 8-23 Installing Abbreviated Dialing Table on the Terminal

SECTION 11 WALL MOUNTING THE DTH/DTR TELEPHONE

11.1 Hanger Hook

1. Remove the hook from the unit.

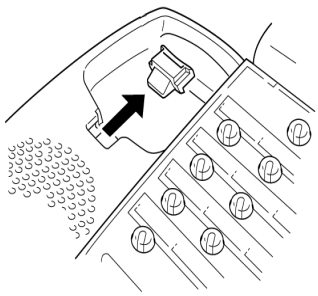


Figure 8-24 Removing the Hook

2. Turn the hook with the tab toward the top.

3. Slide the hook on its glides back down into position forming the hanger hook for the handset.

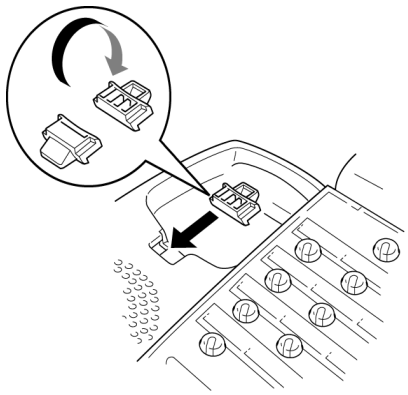


Figure 8-25 Sliding the Hook into Position

11.2 Installing the Base Cover to the Wall

1. Raise and remove the Base Cover. Refer to Section 9 Removing or Installing the Base Cover.

2. Remove cutout shown in Figure 8-26 Removing Cutout with nippers.

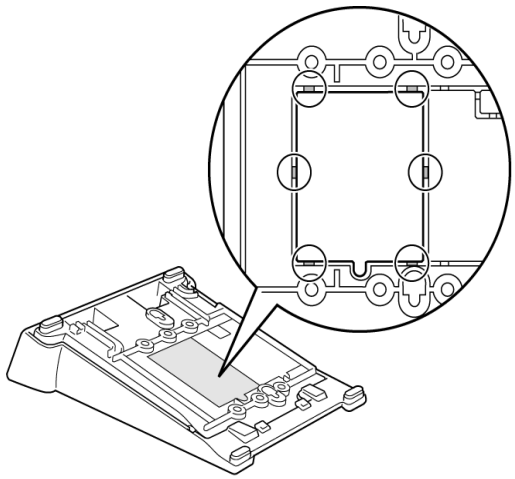


Figure 8-26 Removing Cutout

3. Plug line cord in the wall receptacle, leave about 8 inches of cord and bundle the rest as shown in Figure 8-27 Bundling Line Cord.

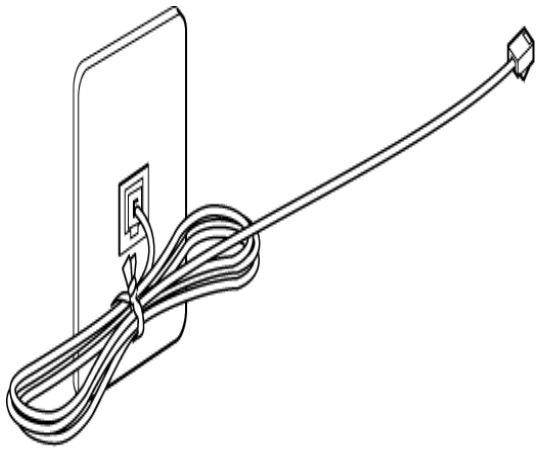


Figure 8-27 Bundling Line Cord

4. Turn the Base Cover upside down, feed the line cord in the cutout and attach it to the wall using 6 screws as shown in Figure 8-28 Installing Base Cover.

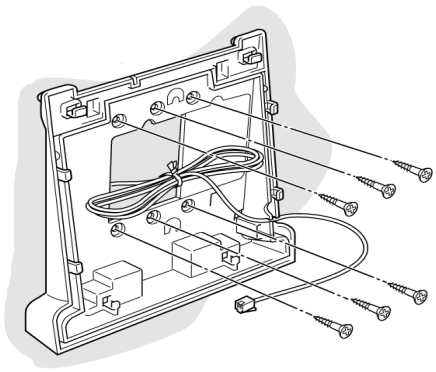


Figure 8-28 Installing Base Cover

5. Install the telephone over the four tabs on the Base Cover, and push down until it clicks in place.

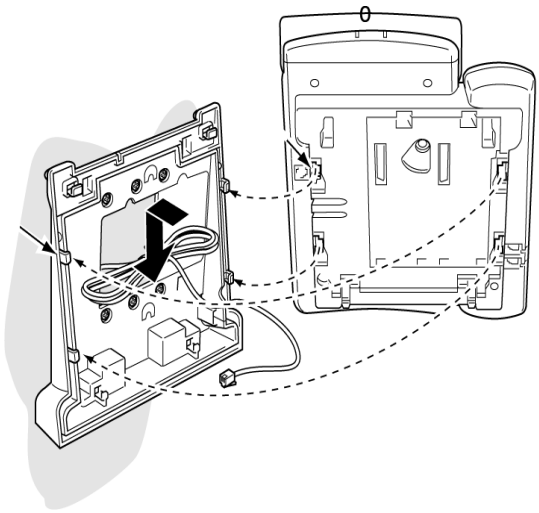


Figure 8-29 Installing the Telephone

6. Install the Line cord as shown in Figure 8-30 Plugging in Line Cord.

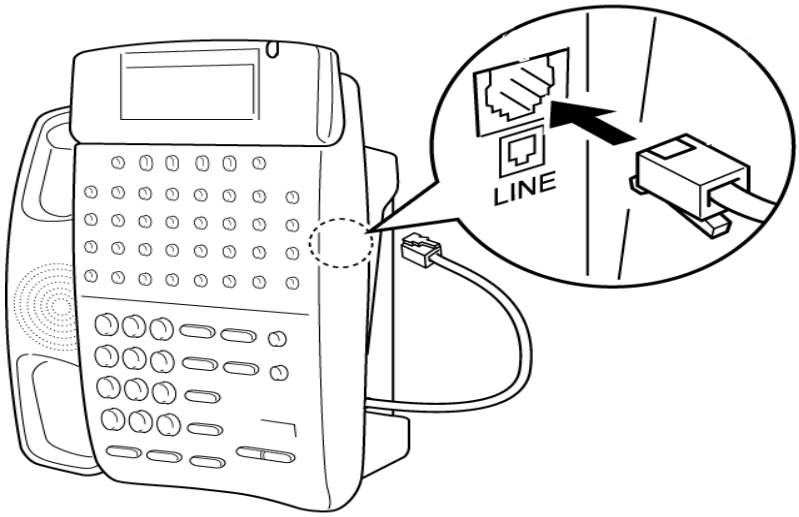


Figure 8-30 Plugging in Line Cord

7. Push spare line cord behind the telephone as shown in Figure 8-31 Hiding Excess Cord.

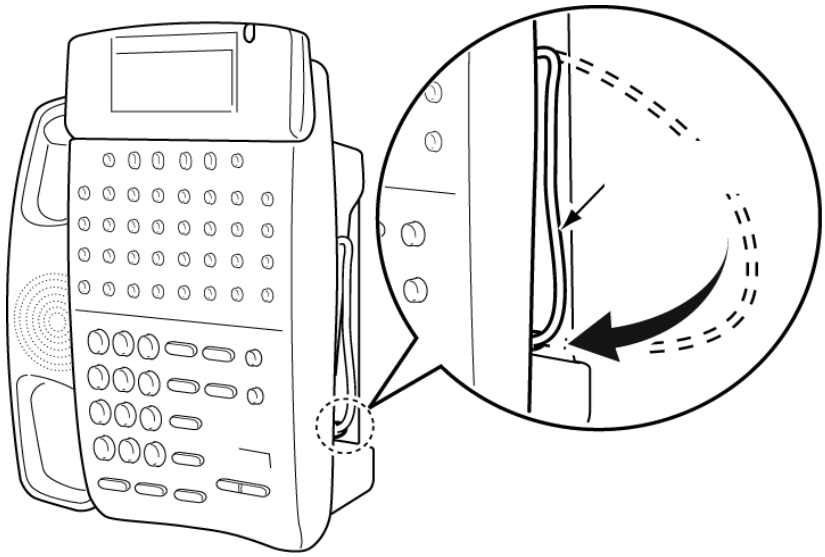


Figure 8-31 Hiding Excess Cord

8. To remove the telephone, press the tabs at the bottom as shown in Figure 8-32 Removing the Telephone, and push up on the Telephone until it comes loose.

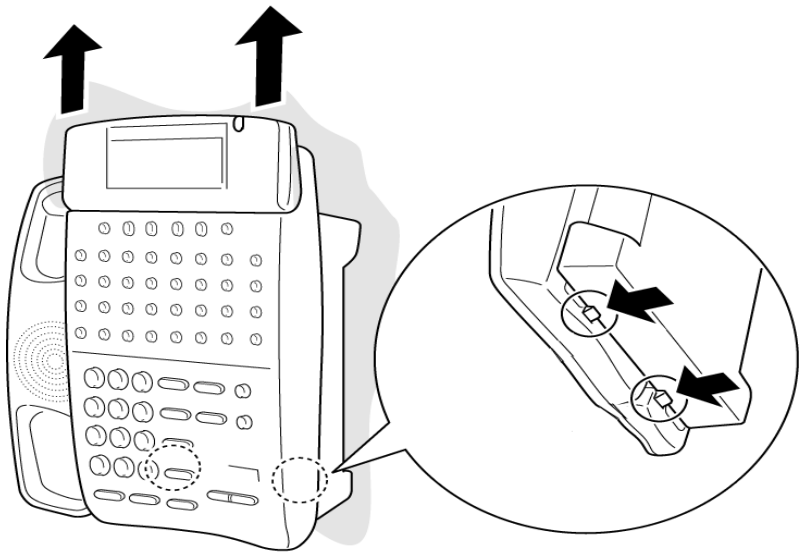


Figure 8-32 Removing the Telephone

11.3 Installing Base Cover on a Switch Box

1. Install the Base Cover as shown in Figure 8-33 Installing Base Cover on Switch Box.

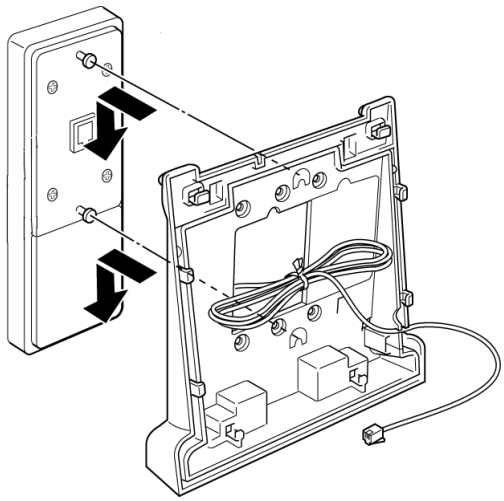


Figure 8-33 Installing Base Cover on Switch Box

2. Install the telephone.

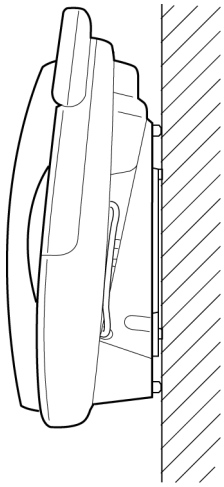


Figure 8-34 Wall Installation Complete

11.4 Installing Telephone Using WM-R Unit

When adapters are used, the telephone must be installed on the wall using the WM-R Unit.

1. Attach WM-R Unit using 6 screws as shown in Figure 8-35 Installing WM-R Unit on the Wall. Place excess line cord in the space in the back of the WM-R Unit.

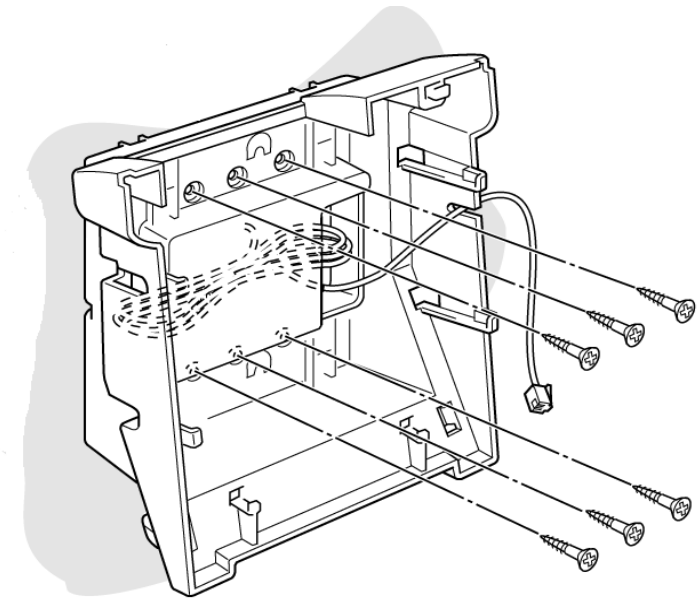


Figure 8-35 Installing WM-R Unit on the Wall

2. Install the telephone as shown in Figure 8-36 Installing Telephone on WM-R Unit.

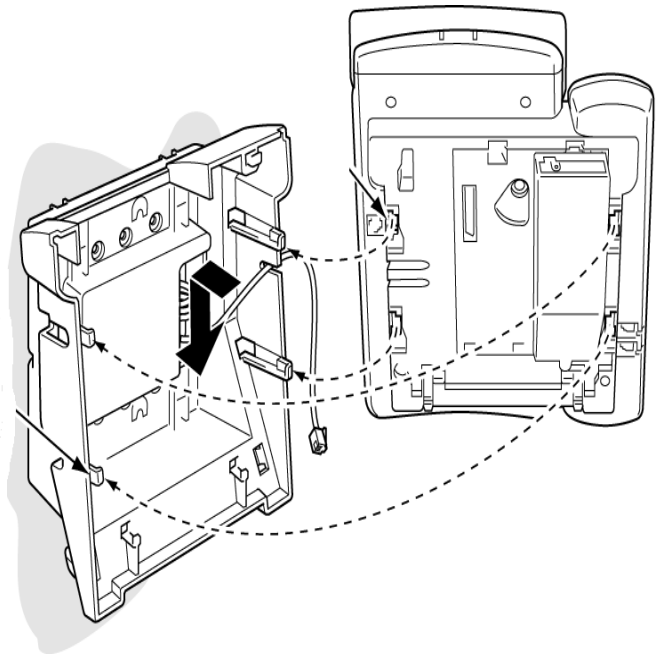


Figure 8-36 Installing Telephone on WM-R Unit

SECTION 12 INSTALLING DTH/DTR OPTIONAL EQUIPMENT

Optional equipment for the DTH/DTR Multiline Terminals enhances the Electra Elite 48 system. This equipment can be purchased separately from the system and added as the customer business grows.

DTH/DTR Multiline Terminals can have up to two adapters installed at the same time.

When attaching an AP(R)-R Unit, an external power supply is required. Only **one** power supply is needed even if more than one adapter is installed.

SECTION 13 PREPARING DTH/DTR MULTILINE TERMINAL FOR ADAPTER INSTALLATION

To prepare the DTH/DTR Multiline Terminal for adapter installation:

1. Unplug the telephone cord from the terminal.

2. Turn the terminal upside down.

3. Grasp in the middle of the hollow spaces at the top and pull up until; the retaining tabs click to raise the base plate. Refer to Figure 8-37 Raising the Base Plate.

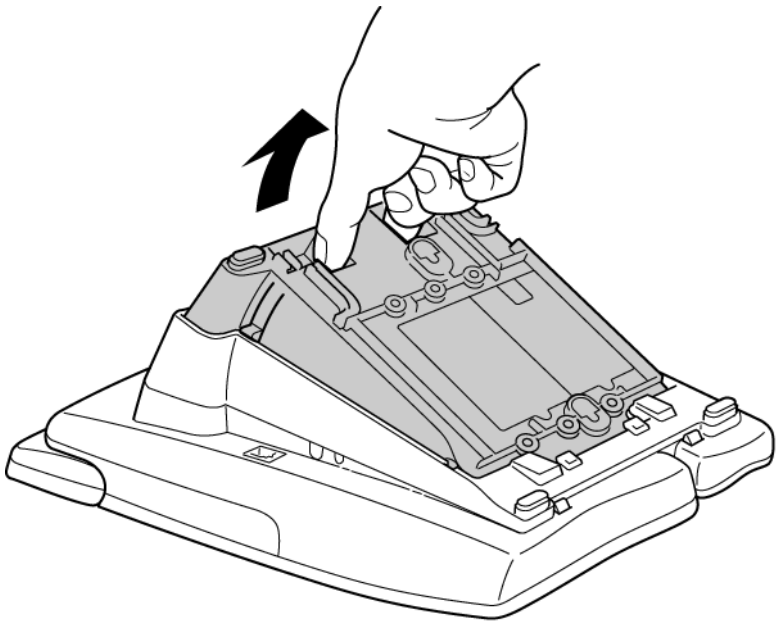


Figure 8-37 Raising the Base Plate

4. Press down on the tabs indicated in Figure 8-38 Removing the DTH/DTR Base Plate, and push forward on the base plate to remove it.

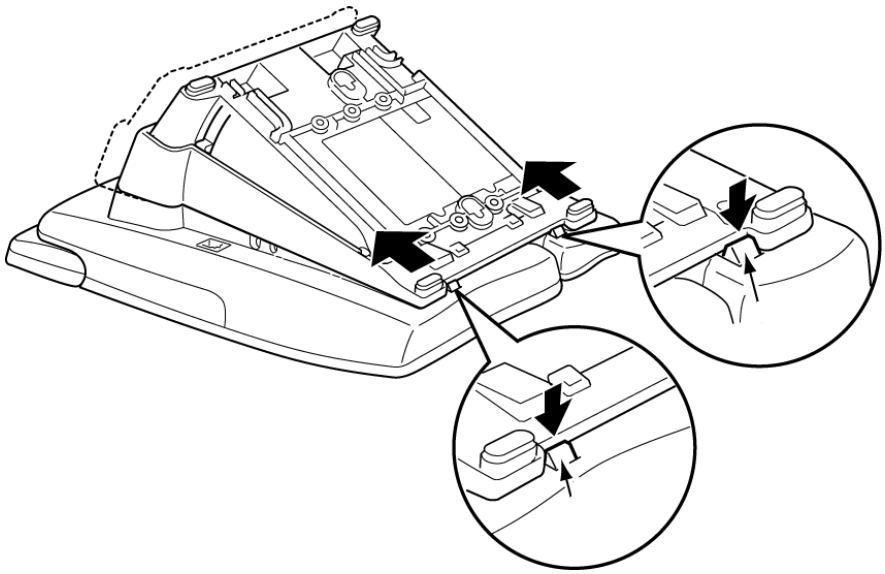


Figure 8-38 Removing the DTH/DTR Base Plate

5. When an adapter is installed for the first time in a terminal, the base cover on the Multiline Terminal must be modified. Two adapters can be installed in the terminal, and two separate cutouts are provided. Remove the applicable cutout/cutouts on the bottom of the base plate with nippers. When only one adapter is being installed and it needs an AC-R Unit for power, remove only the Right cutout as shown in Figure 8-39 Modifying Base Cover.

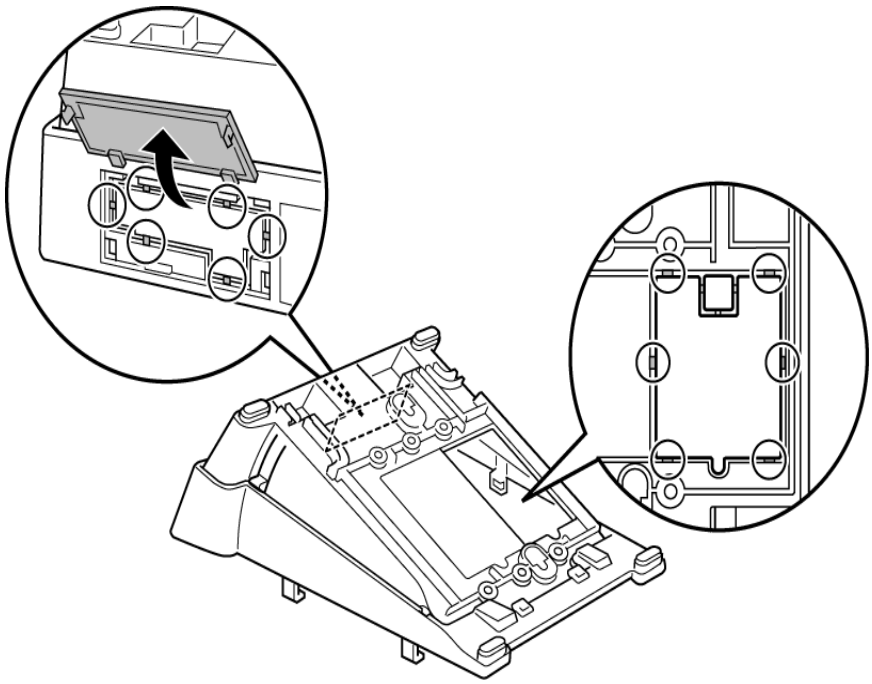


Figure 8-39 Modifying Base Cover

6. Turn the base plate with bottom down and release two tabs at the top for each end cover (shown shaded) corresponding to applicable base plate cutout/cutouts and remove the cover/covers.

7. Remove the applicable dummy end/ends with nippers.

8. When An AC-R Unit is required for power, remove the cutout on the right side of the base plate (with the bottom facing up) to accommodate the power adapter cord.

SECTION 14
INSTALLATION PROCEDURES

14.1 AC-R Unit (AC Adapter)

This unit shown on Figure 8-40 AC-R Unit provides power to ancillary devices or DTR Attendant Consoles. The AC-R Unit must be connected to an adapter that is installed on a Multiline Terminal. When more than one adapter is installed on a Multiline Terminal, only one AC-R Unit is necessary.

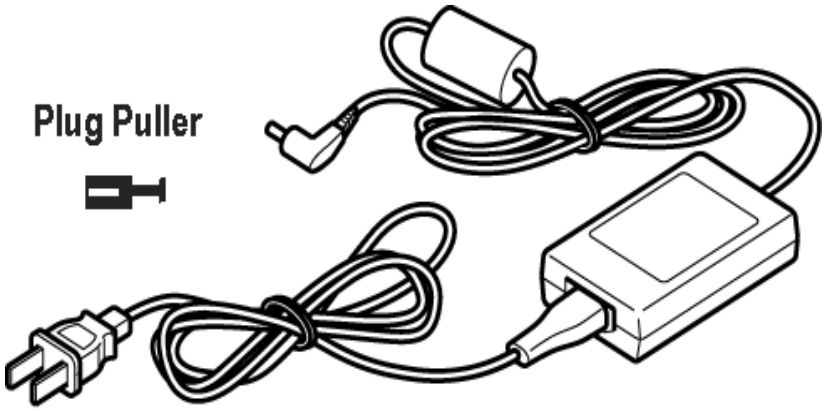


Figure 8-40 AC-R Unit

The power requirements for the AC-R Unit are:

- Input: 110~240V AC, 50/60 Hz, 45 VA
- Output: 27V DC, 750 mA
- Polarity: ⊖———›———⊕

14.1.1 Connecting the AC-R Unit

1. Unplug the AC-R Unit from the AC outlet. (Failing to do this can damage the unit and/or the Multiline Terminal.)

2. Prepare Multiline Terminal for adapter installation. Refer to Section 13 Preparing DTH/DTR Multiline Terminal for Adapter Installation on page 8-28.

3. The Plug Puller shown in Figure 8-40 AC-R Unit is a hollow cylindrical sleeve with a post and a circular rim on the base. The plug of the adapter is inserted in this hole, and the sleeve is pulled over the back of the plug to seat the post that can then be used to unplug the adapter.

4. Locate the plug on the ancillary device that is connected to the bottom of the Multiline Terminal and plug in the AC Adapter.

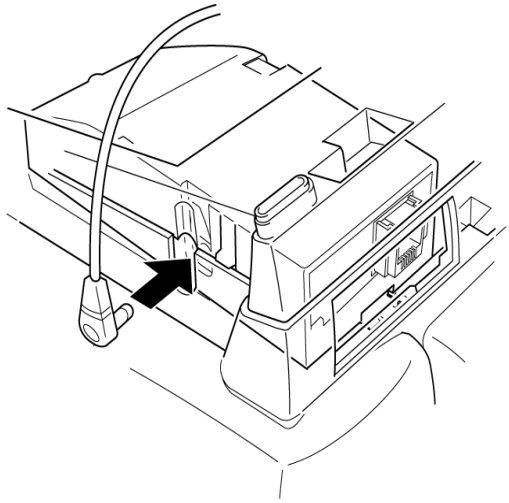


Figure 8-41 AC-R Unit Connection to Adapter

14.2 AD(A)-R Unit (Ancillary Device Adapter)

This Ancillary Device Adapter, shown on Figure 8-42 AD(A)-R Unit, allows connection of a tape recorder to all DTH/DTR Multiline Terminals except DTR-2DT-1 as shown on Figure 8-43 Connecting DTH/DTR to Recorder.

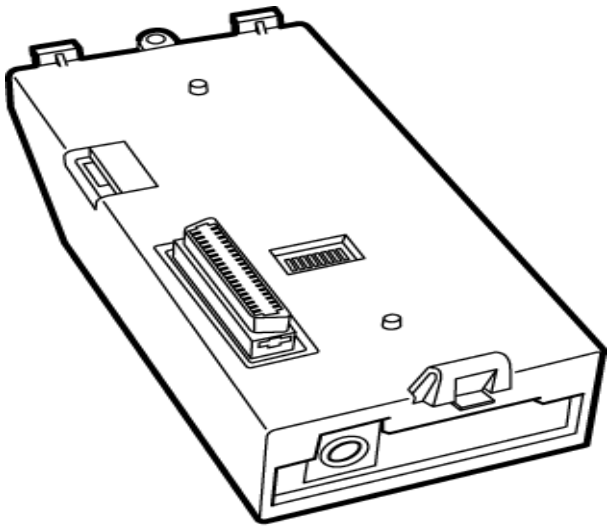


Figure 8-42 AD(A)-R Unit

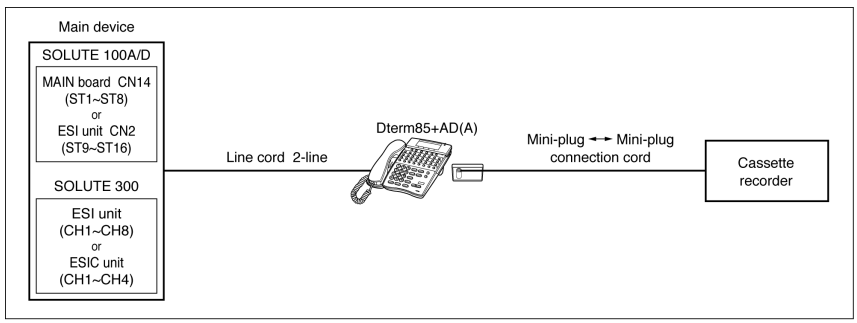


Figure 8-43 Connecting DTH/DTR to Recorder

14.2.1 Switch Settings and Wiring

1. When voice calls are only recorded, Remove the cover for the DSW Switch with nippers, and set the switches as shown in Figure 8-44 AD(A)-R Switch With Default Settings and wire between the AD(A) and recorder as shown in Figure 8-46 DSW Switch Settings for Sending Voice Calls to Terminal.

2. Table 8-1 AD(A)-R Unit Switch Settings provides a breakdown of the DSW switch settings.

Table 8-1 AD(A)-R Unit Switch Settings

Switch	Default Setting		Description
DSW 1	Off		When the AD(A)-R provides control to the recorder, DSW 1 must be On.
DSW 2	Off		Warning Tone from any device is sent to terminal when DSW 2 is On
DSW 3 and DSW 4	DSW 3 On	DSW 4 On	To get a warning Tone from recording device over same wire pair as speech path, both switches must be Off.
	DSW 3 On	DSW 4 On	To get a warning Tone from recorder or generator equipment on dedicated wire pair to recorder MIC input, DSW 3 must be Off.
DSW 5	On		Must be Off for Debugging
DSW 6~ 8	Off		Must be On to Upgrade Firmware
SW1	SW1-1		Connect to Series i DTR. SW1-2 selects IP Phone-IRT
SW2	SW2-1		600 Ω Input Impedance SW2-2 selects Complex Impedance for SLTs
SW3	Not Installed		

☞ Do not connect T1 and T2 when DSW switches 3 and 4 are On.

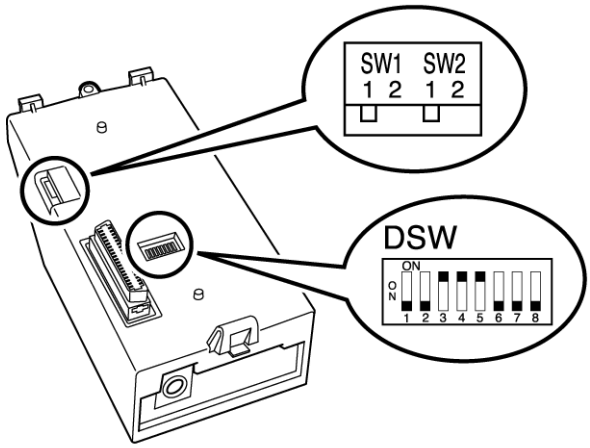


Figure 8-44 AD(A)-R Switch With Default Settings

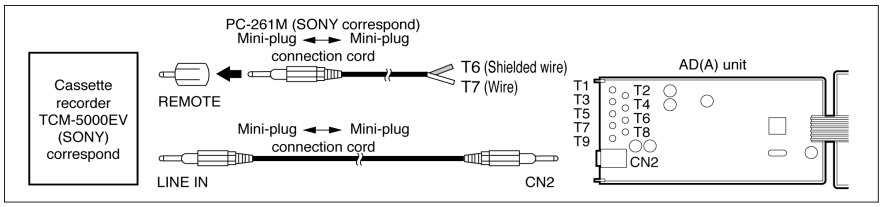


Figure 8-45 AD(A) Connection for Recording Only

3. When sending recorded calls to the terminal, Set the DSW Switch to settings shown in Figure 8-46 DSW Switch Settings for Sending Voice Calls to Terminal and connect wiring to recorder as shown in Figure 8-47 Connections for Sending Calls to The Terminal.

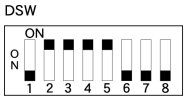


Figure 8-46 DSW Switch Settings for Sending Voice Calls to Terminal

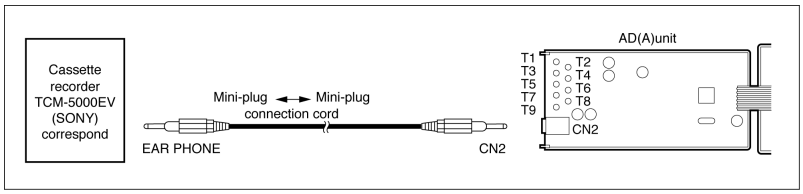


Figure 8-47 Connections for Sending Calls to The Terminal

14.2.2 Installing Core and Shielded Cable

1. Remove the screw shown on Figure 8-48 Removing Cover, and carefully open the AD(A)-R Unit.

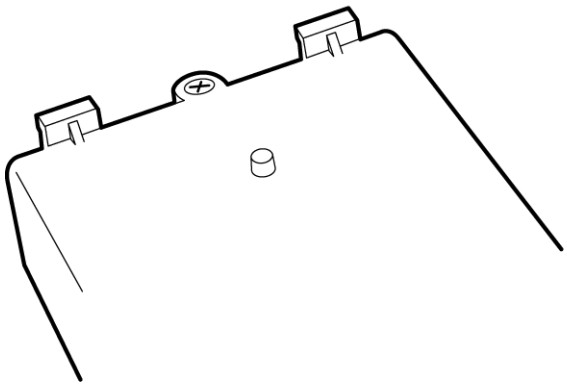


Figure 8-48 Removing Cover

2. Insert cable into the AD(A)-R Unit terminal, fit a cap (included with the Unit) over the cable and push to anchor it as shown in Figure 8-49 Core Cable Installation. The core cable should be inserted with its cover. The shielded cable should be bundled before inserting it in the terminal.

3. Feed the installed cable out through the CN2 window as shown in Figure 8-50 Cable Access Port.

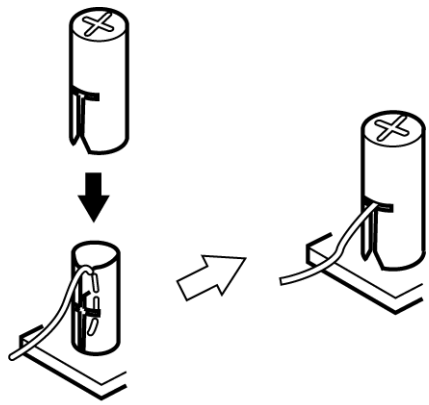


Figure 8-49 Core Cable Installation

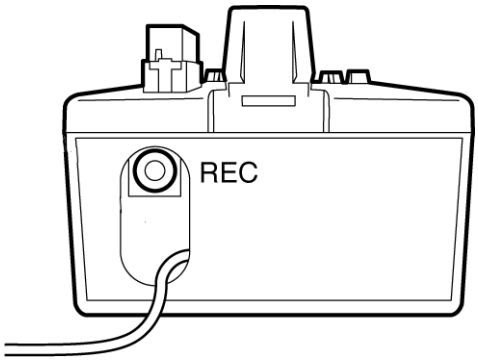


Figure 8-50 Cable Access Port

14.2.3 Installing the AD(A)-R Unit on a DTH/DTR Multiline Terminal

1. Unplug the telephone cord (and the AC-R Unit cord if installed) from the Multiline Terminal.

2. Prepare Multiline Terminal for adapter installation. Refer to Section 13 Preparing DTH/DTR Multiline Terminal for Adapter Installation.

3. Plug the A and B tabs in adapter slots as shown on Figure 8-51 Attaching the AD(A)-R Unit to the Multiline Terminal, and press down on the adapter until it clicks into place.

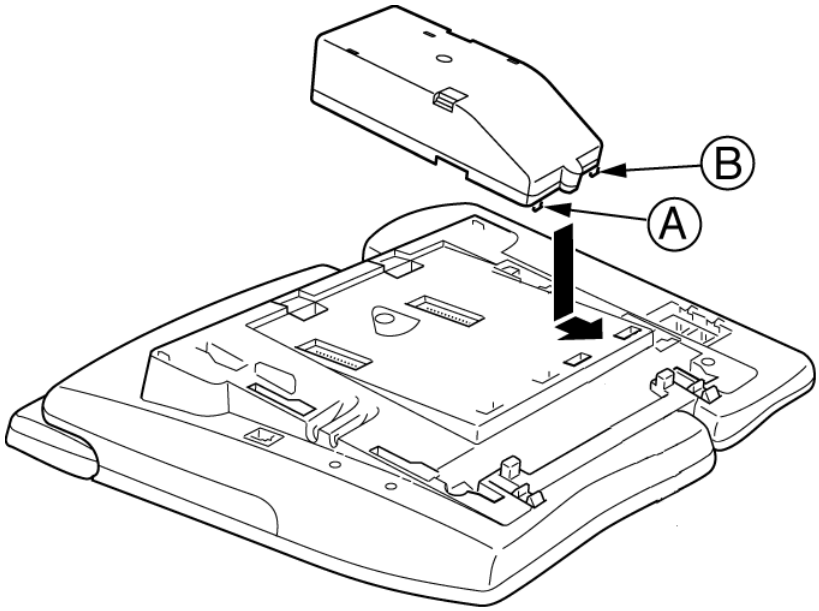


Figure 8-51 Attaching the AD(A)-R Unit to the Multiline Terminal

4. Install the Base Cover and the line cord.

14.2.4 AD(A)-R Connections and Specifications

Table 8-2 AD(A)-R Cable Connections provides a cable connections list and describes the specifications for the AD(A)-R Unit.

Table 8-2 AD(A)-R Cable Connections

Terminal Number	Cables to Connect	Terminal Specifications
T1	When warning tone is not being sent from the recorder, connect wire pair input from tone generator to T1:T2. The warning tones from the generator are sent to T1:T2 on a dedicated wire pair while the speech path is sent from the Input/Output Terminal: Refer to dip switch settings in Table 8-1 AD(A)-R Unit Switch Settings. on T3:T4 over a separate wire pair to the recorder.	Input Terminal: T1 and T2 are enabled for tone generating device when DSW switches 3 and 4 are OFF. (When DSW switches 3 and 4 are ON, a humming sound may be recorded due to impedance mismatch.) Input Impedance on T1 and T2: 100K Ω Input Level on T1 and T2: –15 dB ~ 40 dB
T2		
T3:T4	Connect recorder device wire pair speech input to T3:T4. When the recorder used supplies a warning tone, this tone may also be sent over the T3:T4 wire pair back to the terminal.	Input/Output Terminal: Refer to dip switch settings in Table 8-1 AD(A)-R Unit Switch Settings.
T5	Connect the bare end of the control cable.	When a Multiline Terminal is idle, this contact is closed. When the Multiline Terminal goes off-hook (using the handset, headset, or speakerphone), this contact is open. ***When recorder owner manual specifies start on open circuit, connect T5 and T6.***
T6	Connect the shielded end of the control cable.	Provides common connection for control cable.
T7	Connect the bare end of the control cable.	When the Multiline Terminal is idle, this contact is open. When the Multiline Terminal is busy (using the handset, headset, or speakerphone), this contact is closed. ***When recorder owner manual specifies start on closed circuit, connect T6 and T7.***
T8	Unused	
T9	Unused	
REC Jack	Connect recorder device wire pair speech input to REC Jack. When the recorder used supplies a warning tone, this tone may also be sent through the REC Jack wire pair back to the terminal.	Input/Output Terminal: Refer to dip switch settings in Table 8-1 AD(A)-R Unit Switch Settings.

Table 8-2 AD(A)-R Cable Connections (Continued)

Notes:

- ☞ When recording in handsfree (half-duplex) mode using the built-in speakerphone, the record warning tone may not be audible to the far-end party.
- ☞ The transmit recording level is lower than the receiving voice level for intercom calls; the transmit recording level for CO calls is normal.
- ☞ Depending on the recording device(s), separate cables may be required for the warning tone and speech path. In this case, connect the warning tone cables to input terminals T1 and T2 on the AD(A)-R Unit. (T3 and T4 are used as the tape recorder input.)
- ☞ When remote control of the recorder is necessary, the record start/stop control is provided by connecting to T5 (or T7) and T6 on the ADA-U Unit. (Connecting to T5 or T7 is determined by the specifications of the recorder.)
- ☞ When a warning Tone is provided from the recording equipment, it should be input via T3 and T4 on AD(A)-R Unit. (Do not use T1 and T2 to input Beep Tone.)
- ☞ Conversations cannot be recorded from terminals connected to an AP(R)-R Unit.

14.3 AP(A)/AP(R)-R Unit (Port Adapter)

The Analog Port Adapter without Ringer AP(A) or Analog Port Adapter with Ringer AP(R) is the interface for installing Single Line Telephones, Modems, Credit Card Readers, Wireless Headsets, NEC VoicePoint/VoicePoint Plus Conferencing unit, and other compatible analog devices. The AP(R)-R Unit generates ringing signals and requires an AC-R Unit. Refer to Figure 8-52 AP(A)/AP(R)-R Unit and Switches. Refer to Figure 8-53 Typical Connection for an example.

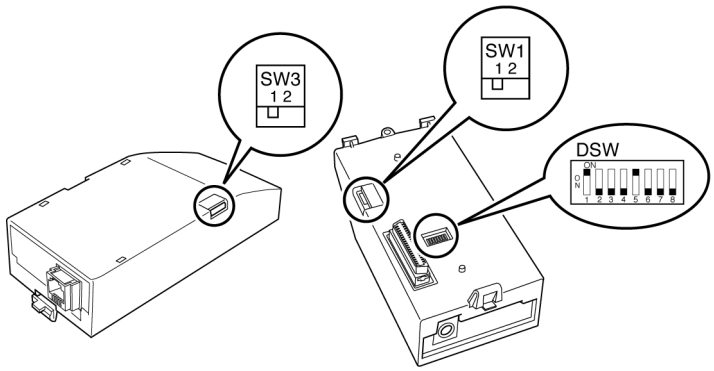


Figure 8-52 AP(A)/AP(R)-R Unit and Switches

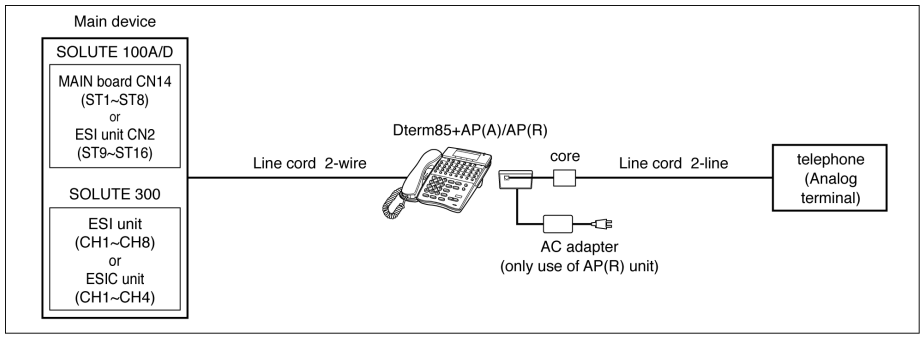


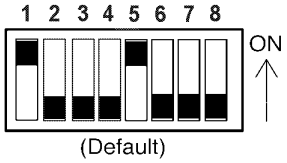
Figure 8-53 Typical Connection

14.3.1 Installing AP(A)-R or AP(R)-R Unit on any DTH/DTR Multiline Terminal except DTR-2DT-1

1. Prepare Multiline Terminal for adapter installation. Refer to Section 13 Preparing DTH/DTR Multiline Terminal for Adapter Installation.

2. Set the SW1, SW3 and DSW switches to default settings shown in Table 8-3 AP(A)-R/AP(R)-R Unit Switch Settings. Use nippers to remove the cover over the DSW switch.

Table 8-3 AP(A)-R/AP(R)-R Unit Switch Settings

Switch	Setting/Description
SW1-1	Connect to DTH/DTR (default)
SW1-2	IP Phone-IRT
SW3–1	Sets impedance to 600Ω for devices such as modems or facsimile machines (default).
SW3–2	Used for complex impedance devices such as Single Line Telephones.
DSW	

3. Hook tabs A and B in the slots on the Multiline Terminal as shown in Figure 8-54 Attaching the AP(A)/AP(R)-R Unit to the DTH/DTR Multiline Terminal, and press down until the unit clicks into place.

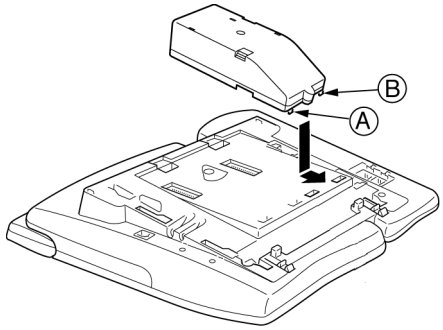


Figure 8-54 Attaching the AP(A)/AP(R)-R Unit to the DTH/DTR Multiline Terminal

4. Close the base plate, and snap the cover in place.

5. Install the ferrite core (provided with either Unit) about 2 inches from the line cord plug as shown in Figure 8-55 Installing Ferrite Core.

6. Connect the line cord to the unit. Limit the cable length from the AP(A)/AP(R)-R Unit to the Single Line Telephone to a maximum of 50 feet.

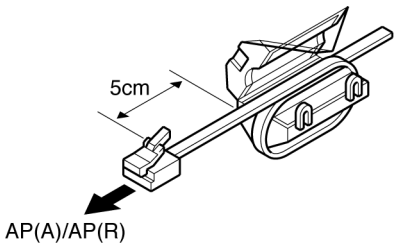


Figure 8-55 Installing Ferrite Core

7. For the AP(R)-R only, plug the AC adapter power cord in the indicated AP(R)-R Unit receptacle and connect it to a power source.

8. Install the extended base plate.

14.4 CT(A)-R Unit (Computer Telephony Adapter)

Computer Telephony Adapter shown in Figure 8-56 CT(A)-R Unit allows a DTH/DTR Multiline Terminal connection to a PC. The PC can perform all Multiline Terminal functions using a TAPI-compatible application software.

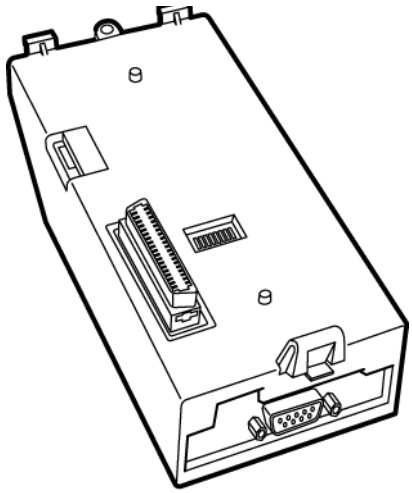


Figure 8-56 CT(A)-R Unit

14.4.1 Typical Connection using an ESI/ESIC

Refer to Figure 8-57 Typical Connection for ESI/ESIC.

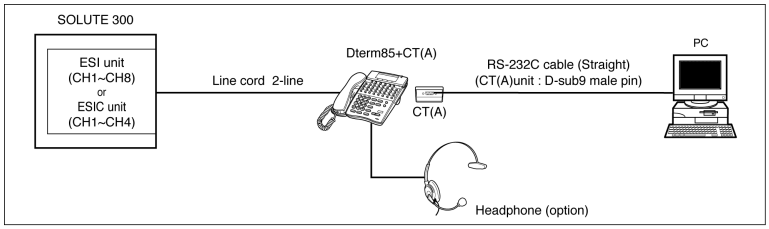


Figure 8-57 Typical Connection for ESI/ESIC

14.4.2 Typical Connection using VDH ETU

Refer to Figure 8-58 Typical Connection Using VDH ETU.

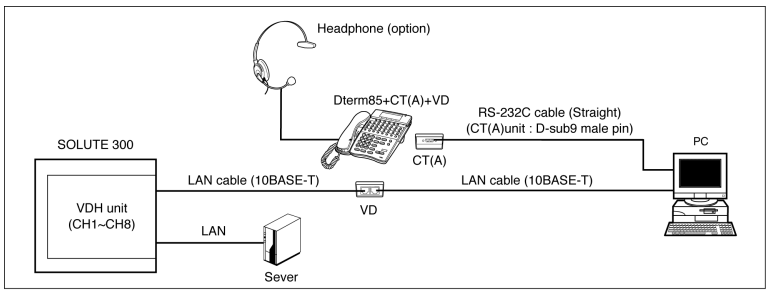


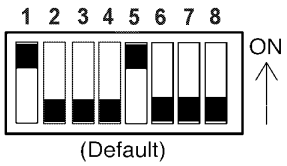
Figure 8-58 Typical Connection Using VDH ETU

14.4.3 Installing the CT(A)-R Unit

1. Prepare Multiline Terminal for adapter installation. Refer to Section 13 Preparing DTH/DTR Multiline Terminal for Adapter Installation.

2. Set CT(A)-R Unit switches to default settings. Refer to Table 8-4 CT(A)-R Unit Switch Settings.

Table 8-4 CT(A)-R Unit Switch Settings

Switch	Setting/Description
SW1	1 (default)
SW3–1	Sets impedance to 600Ω for devices such as modems or facsimile machines.
SW3–2	Used for complex impedance devices such as Single Line Telephones.
DSW	

3. Hook tabs A and B in the slots on the Multiline Terminal as shown in Figure 8-59 Attaching the CT(A)-R Unit to the DTH/DTR Multiline Terminal, and press down until the unit clicks into place.

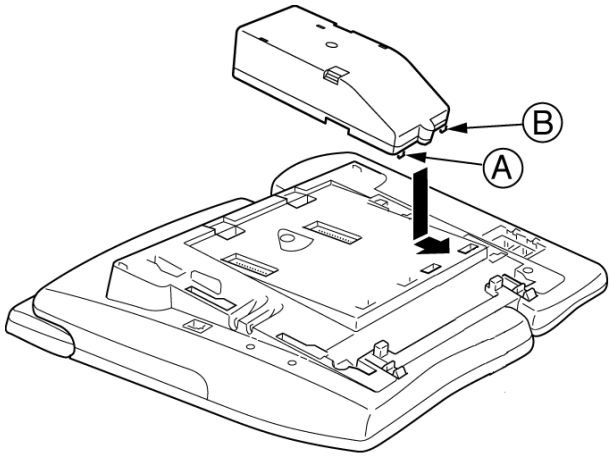


Figure 8-59 Attaching the CT(A)-R Unit to the DTH/DTR Multiline Terminal

4. Install the extended base cover.

5. Install the line cord.

6. Install the headset and anchor it in the cord slot as shown in Figure 8-60 Installing and Anchoring Headset.

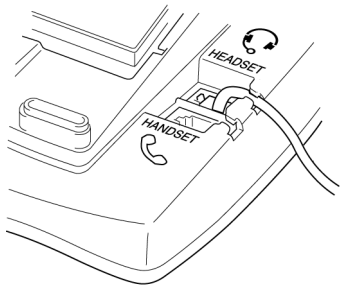


Figure 8-60Installing and Anchoring Headset

7. Connect the RS-232C cable from the computer to the connector on the CT(A)-R Unit as shown in Figure 8-61 Connecting the RS-232C Cable to the CT(A)-R Unit on the Multiline Terminal.

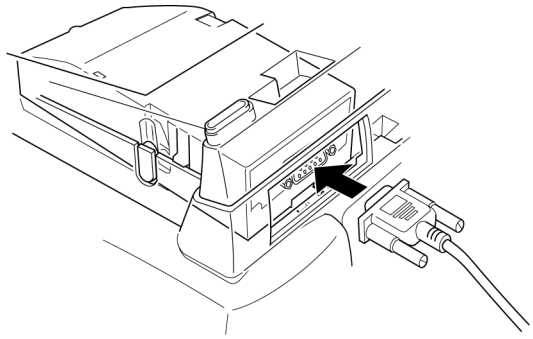


Figure 8-61 Connecting the RS-232C Cable to the CT(A)-R Unit on the Multiline Terminal

14.4.4 Installing the Driver on the PC

Using the setup disk provided with the CT(A)-R Unit install the driver onto your PC. Refer to the *product installation guide* for instructions on installing CT(A) setup disks.

14.5 Removing or Installing BS(E)-R Key Unit

To remove this unit:

1. Remove the Line Card and Line Panel from the Multiline Terminal.

2. Pull the tab on the right side of the key unit and lift out the unit to the left as shown in Figure 8-62 Removing Key Unit.

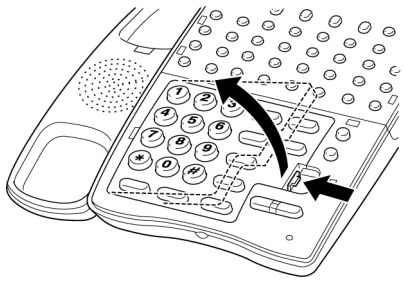


Figure 8-62 Removing Key Unit

To Install this unit:

1. Insert the two tabs on the left of the key unit in the slots as shown in Figure 8-63 Installing Key Unit.

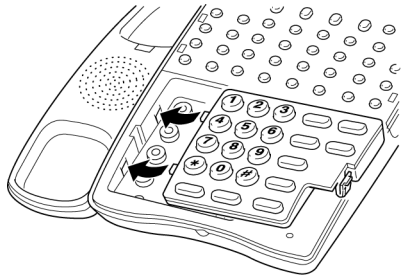


Figure 8-63 Installing Key Unit

2. Push the unit to the left and press down until it clicks into place.

3. Install the Line Card and Line Panel.

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Installing Electra Professional Equipment

CHAPTER 9

SECTION 1 GENERAL INFORMATION

Electra Professional Multiline Terminals can be installed on an Electra Elite 48 system providing inexpensive migration to the Electra Elite 48 system. This chapter provides instructions for connecting these terminals to the Electra Elite 48 system.

SECTION 2 ELECTRA PROFESSIONAL MULTILINE TERMINALS

The following Electra Professional Multiline Terminals can be connected to the Electra Elite 48 system.

ETW-8-1/2 TEL

ETW-16DC-1/2 TEL

ETW-16DD-1/2 TEL

ETW-24DS-1/2 TEL

EDW-48-1/2 DSS/BLF

SECTION 3 CONNECTING AN ELECTRA PROFESSIONAL MULTILINE TERMINAL TO THE ELECTRA ELITE 48 SYSTEM

3.1 Modular Terminal Connections

3.1.1 Connecting Multiline Terminals, Attendant Add-On Consoles, and SLT Adapters

When connecting Electra Professional Multiline Terminals, Attendant Add-On Consoles, or SLT Adapters to the MDF or IDF, individually twisted 1-pair cabling must be used. Refer to Figure 9-1 Modular Terminal Connections for Multiline Terminals and Attendant Add-On Consoles for an illustration of connections.

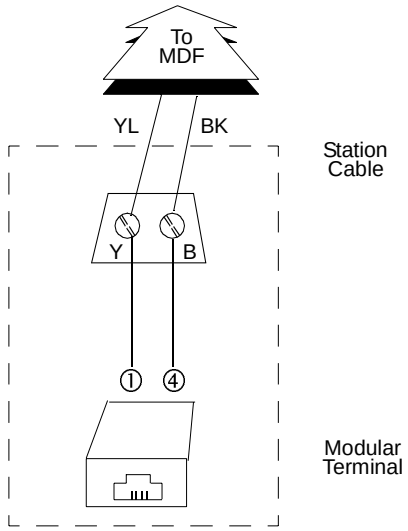

Figure 9-1 Modular Terminal Connections for Multiline Terminals and Attendant Add-On Consoles

3.2 Attach a Multiline Terminal to the System

1. Plug a telephone cord into the modular jack on the bottom side of the Multiline Terminal.

2. Lead the cord out through the cord groove as shown in Figure 9-2 Connect an Electra Professional Multiline Terminal to the Electra Elite 48 System.

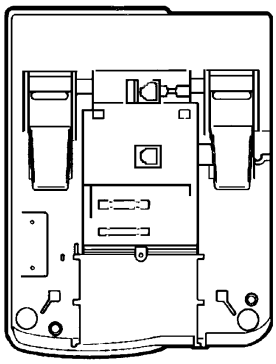

Figure 9-2 Connect an Electra Professional Multiline Terminal to the Electra Elite 48 System

SECTION 4 INSTALLING ANCILLARY DEVICE ADAPTER IN THE MULTILINE TERMINAL

4.1 Ancillary Device Adapter Installation

The ADA(1)-W Unit or the ADA(2)-W Unit can be installed in any Electra Professional multiline terminal in the system.

1. Unplug the line and headset cords.

2. Turn the multiline terminal upside down and place it on a dry surface.

3. Remove the knockout shown in Figure 9-3 Removing Knockout.

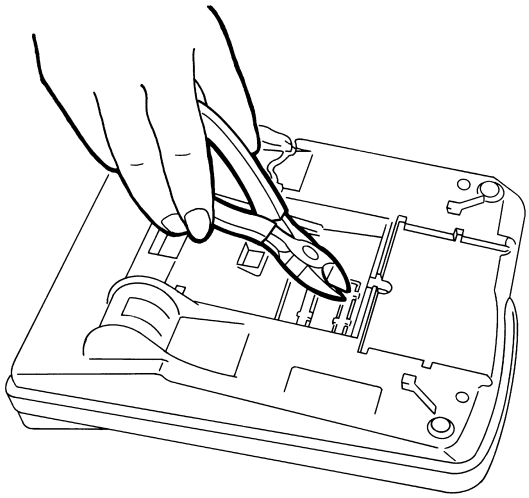

Figure 9-3 Removing Knockout

4. Plug the CN-1 connector on the adapter unit in the CN-4 jack on the main board. Refer to Figure 9-4 Unit Installation.

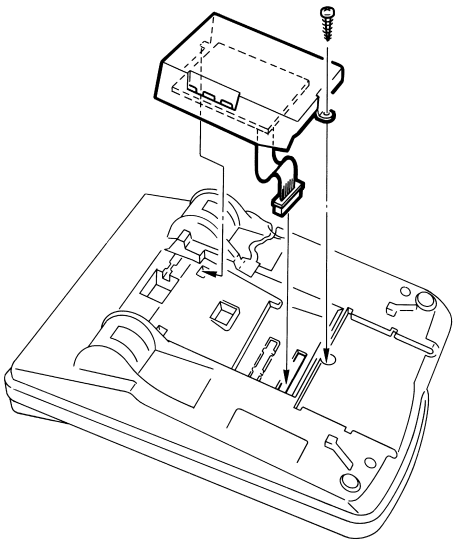

Figure 9-4 Unit Installation

5. Install the ADA component side down in the multiline terminal using the provided screw.

6. Connect external device (*e.g.*, fax, modem, or answering machine) using the information provided in ETIs.

7. When installing ADA(2)-W Unit, plug the AC/DC adapter in the jack on the side of the unit.

8. Test multiline terminal operation, and then test external device operation.

SECTION 5 CONNECTING AN ATTENDANT CONSOLE TO A MULTILINE TERMINAL

An Attendant Console can be attached to a Multiline Terminal using the following procedures.

1. Turn the Multiline Terminal and the Attendant Console face down.

2. Using the joining plate provided with the Attendant Console, attach the plate to the Multiline Terminal and the Attendant Console.

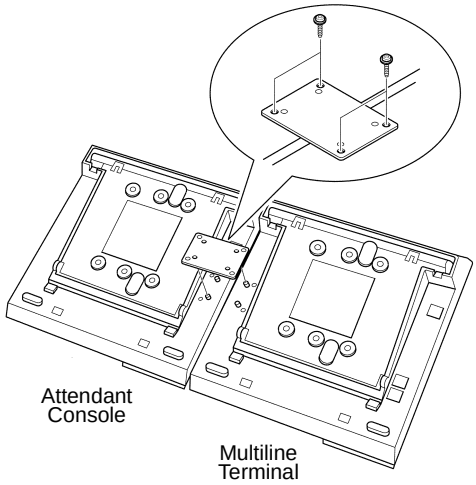

Figure 9-5 Connecting an Attendant Console to a Multiline Terminal

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System Maintenance

CHAPTER 10

SECTION 1 INTRODUCTION

This chapter can be used by the technician to troubleshoot and diagnose problems during and after system installation. The troubleshooting flow charts and general test procedures aid the technician to identify possible causes of the problem by defining the problem area.

Using the System Data Upload/Download feature, all System Programming and Speed Dial data can be stored on disk for safe keeping. All completed System Programming should be downloaded to a disk for backup. If system memory fails, the data on this disk can be uploaded to restore memory.

SECTION 2 OPERATIONAL CURRENT AND VOLTAGE CHECKS

The effectiveness of this maintenance section depends on the technician. The technician should not make any assumptions. For example, a new power supply used to replace another power supply cannot be assumed to be working properly. The output of the power supply must be checked with a volt meter.

The ESI(8)-U10 ETU allows the measurement of +5V and –24V. This ETU can be used for the power output measurements. Refer to Table 10-1 Voltage Measurement. Before the technician can troubleshoot, the correct tools must be available. Some of these are listed below.

- Digital or Analog Multimeter that can read DC and AC current and voltage and DC Resistance.
- Test Set (lineman) that has termination and monitor modes and DTMF and DP dialing.

✆ Hand tools such as:

- Screwdrivers (flat and Phillips head)
- Pliers (long nose and diagonal)
- Punch down tool

SECTION 3 OPERATIONAL TEST PROCEDURES

3.1 General Information

When an Electra Elite 48 system is first powered up, an initialization is performed. During this process, the MBD-U10 Unit, located on the backplane of the B48-U10 KSU, scans each interface slot to determine the hardware configuration used. This information is stored in the resident system program memory with the system default values. This section provides test procedures that are used before, during, and after the initialization process.

3.2 Before Initializing

The technician must follow these steps before initializing the system.

3.2.1 Cable Connections

All wiring for power supplies or flat cable connectors should be checked for solid connections.

3.2.2 AC/DC Power

Check all power with an AC/DC multimeter. (Refer to Table 10-1 Voltage Measurement.) Run this test with no additional interface cards installed.

Table 10-1 Voltage Measurement

Voltages	Tolerance	Measuring Points
ESI(8)-U( ) ETU or MBD-U10 Unit +5V –24V	+5 ± 0.25V –26 ~ –28V	ESI(8)-U( ) ETU or MBD-U10 Unit TP1 +5V TP2 GND TP3 –24V
AC Voltage (117 Vac) Live to Neutral Live to Conduit Ground Neutral to Conduit Ground	117 Vac ± 15% 117 Vac ± 15% 117 Vac ± 15% 0.05 Vac (maximum)	AC Terminal Strip Live L to N Live L to G Live N to G
Ring Generator (SLT)	70 ~ 120 Vac @ 20 Hz *	Across Tip and Ring of Ringing SLT
CO Line Off-hook line current	25 ~ 50 mA	In series with Tip side of the CO line at the MDF

* Ring voltage may be lower if the meter measures only 60 Hz signals.

3.2.3 Initialization Check

To determine if the system is initializing correctly, only the KSU and terminals should be installed on the system. After initialization, all the terminals assigned to the ESI(8)-U( ) ETU that is mounted on the MBD-U10 can be used for internal calls to one another. (By default, these stations are assigned station numbers 100~107).

3.3 System Initialization

After the steps described in Section 3.2 Before Initializing are performed and verified, the entire system should be initialized.

With power OFF, all interface and option cards can be installed in the basic KSU. The technician can then power up the system to perform a First Initialization. After the initialization process, each station display shows default time and date indications.

For example: 12:00 AM WED 1

3.4 After Initialization

Ensure the battery on the MBD-U10 Unit is connected to CN4.

Before any programming is attempted, connect the battery on the MBD-U10 Unit to CN4 to prevent loss of previously programmed data if the system loses power.

Check all ETU slots in software to ensure the initialization process scanned the installed hardware correctly.

A general system operation check should be performed, using default values, prior to system programming.

After all previous steps are performed and all problems corrected, system programming is complete.

After System Programming is finished, the technician should perform a Second Initialization. Performing the First Initialization a second time causes all programming memory to be lost. Second Initialization refreshes the system RAM without losing any memory.

This completes the installation procedure for the Electra Elite 48 system. The technician should check the operation of each Multiline Terminal to ensure the system is working properly.

SECTION 4
TROUBLESHOOTING

4.1 Remote Administration and Maintenance

The Maintenance and Diagnostics feature can remotely access the Electra Elite 48 system for maintenance and diagnostics. The remote PC and the system are connected via a modem (built-in or external).

4.2 Problem Solving

To find the cause of a problem, first consider all of the symptoms carefully. As each aspect of the problem is considered, the technician is guided to a probable solution. The problem must be defined as accurately as possible, so that the most efficient steps to the solution can be taken. Flowcharts in the next section help define the problem.

4.2.1 System Down

This term is used in this section to describe one of the following situations:

- ✆ No access to internal dial tone on any Multiline Terminal or Single Line Telephone is installed.
- ✆ No LED indication, display indication, or Multiline Terminal is installed.
- ✆ No system tones are generated.

4.2.2 Partial Operation

The term refers to any situation that cannot be completely described under the System Down conditions.

4.2.3 Reset

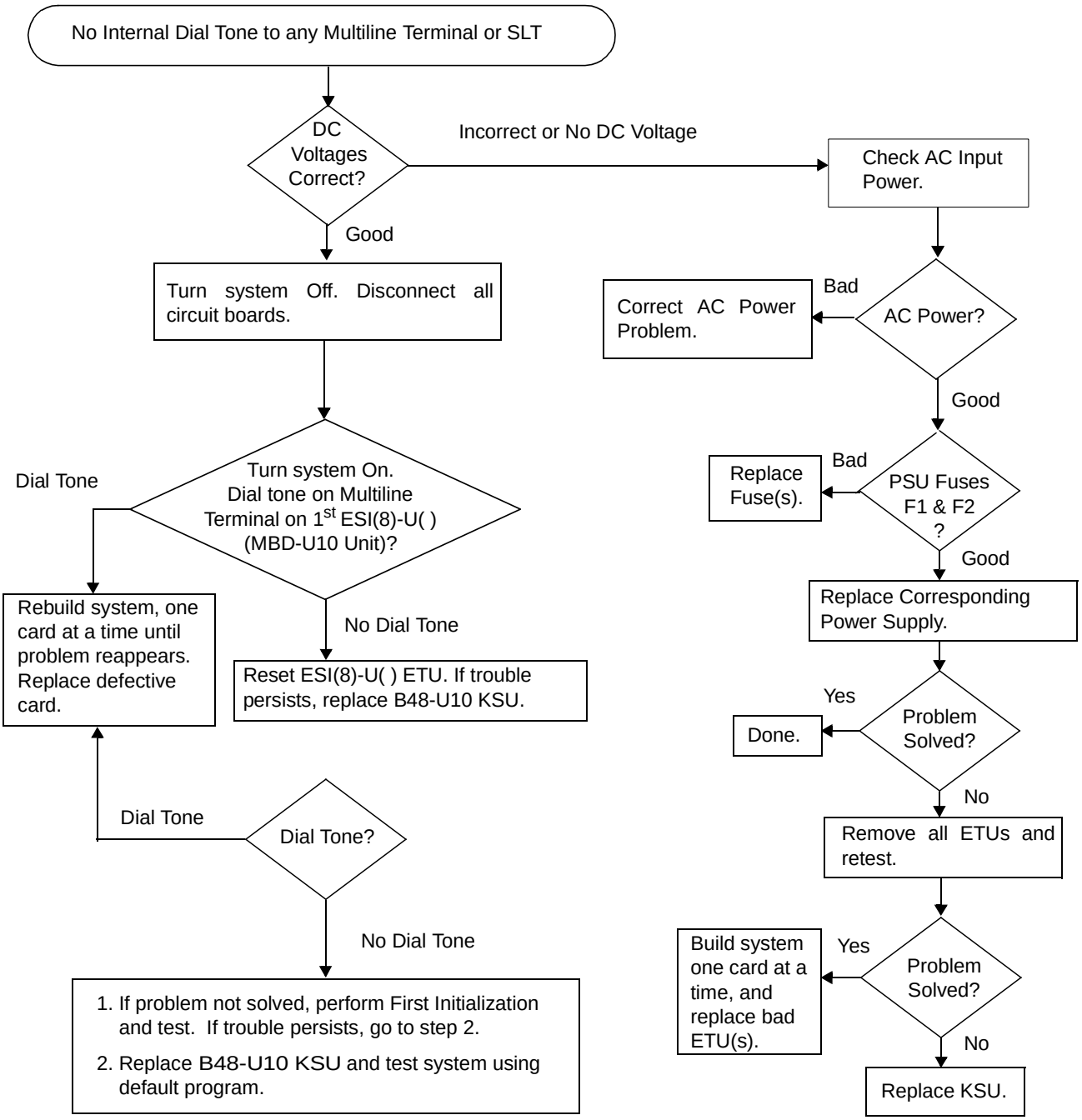
At times, the station and/or the ETU must be reset. The following resets are used in the system.

- Terminal Reset – Unplug the station line cord from the station and then plug it back into the station.
- ETU Reset – Press the RESET switch.

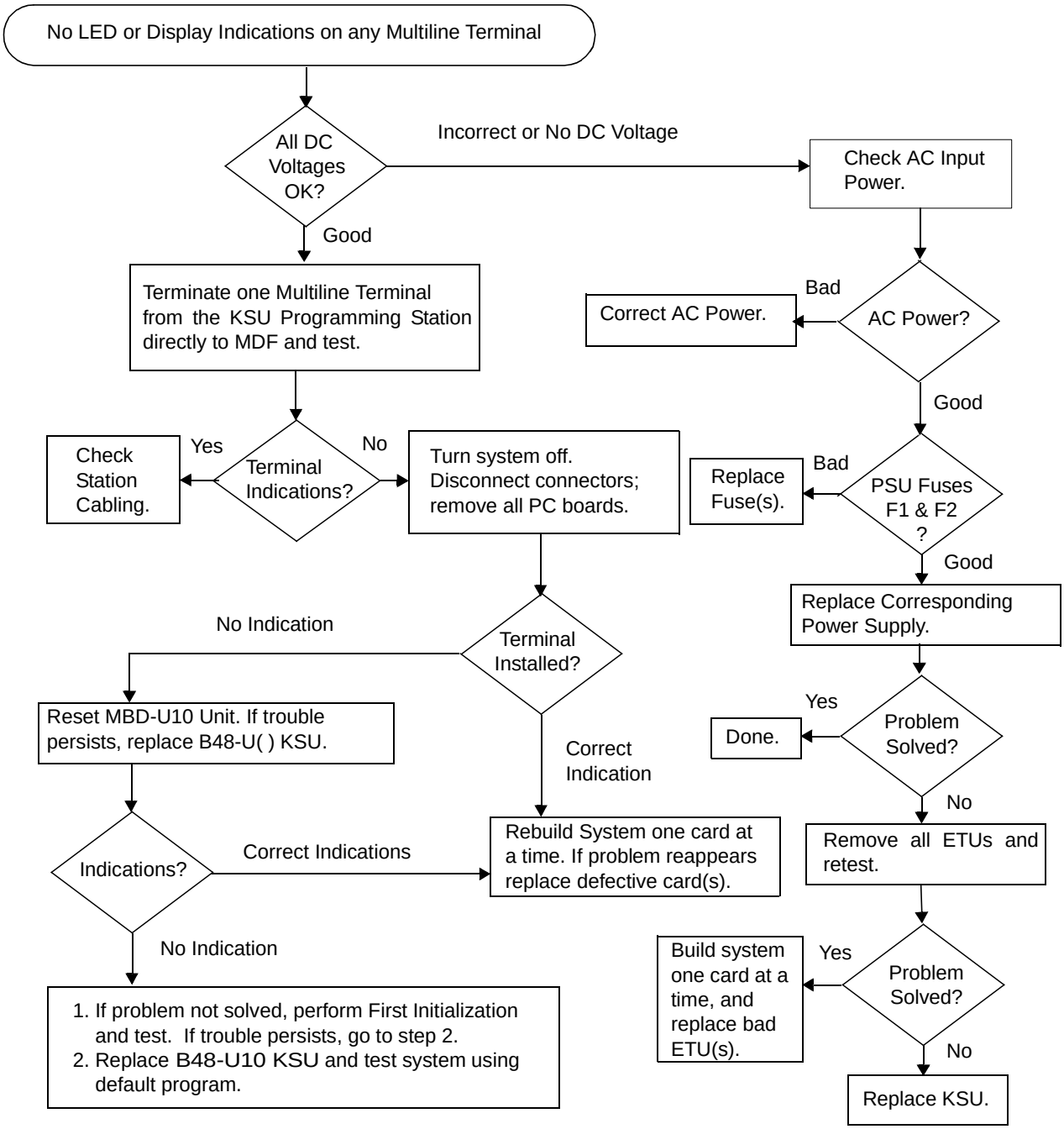
4.3 Flowcharts

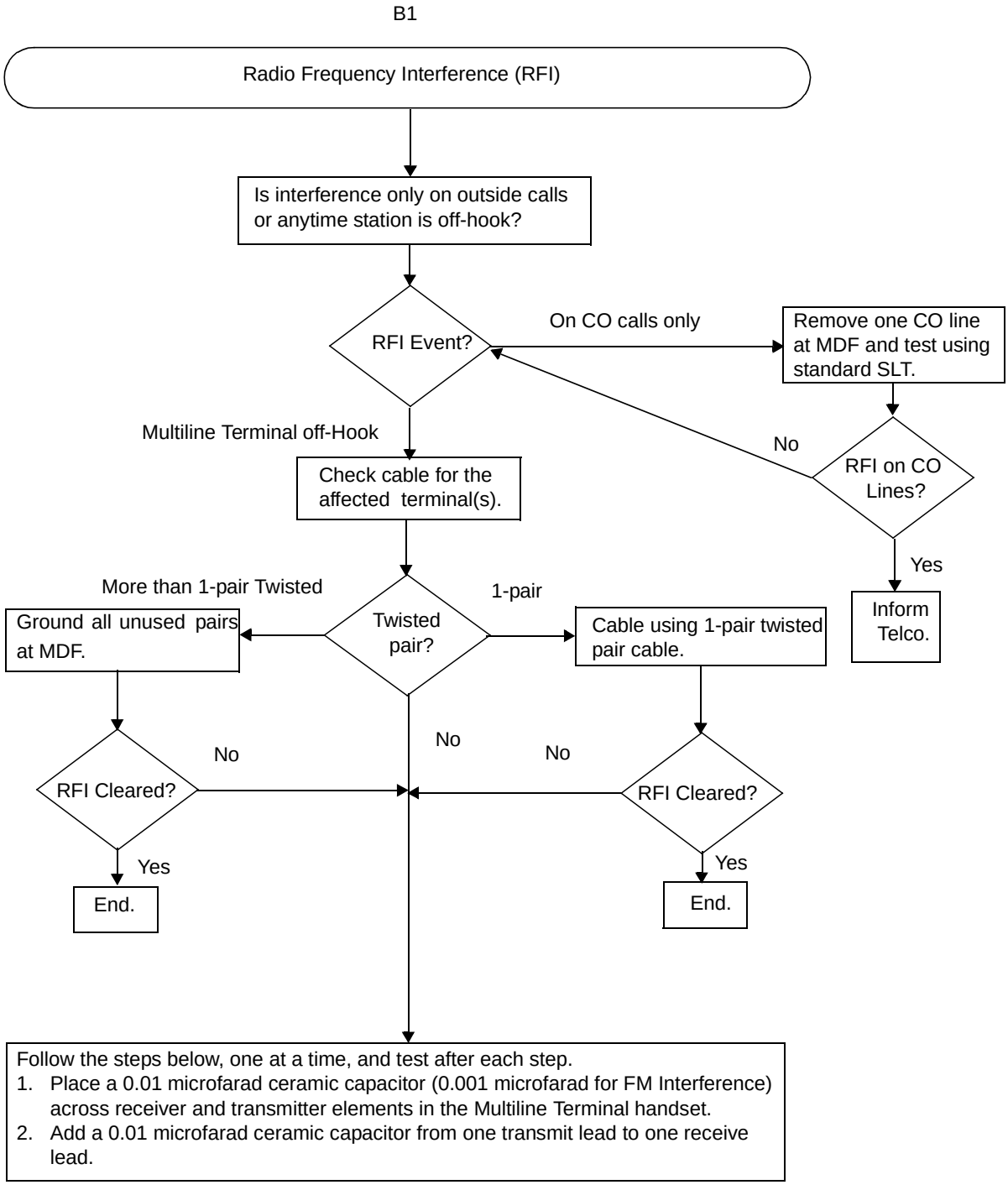
Condition	Flowchart	Page
A. System Down		
1. No Internal Dial Tone to any Multiline Terminal or SLT	A1	10-7
2. No LED or Display Indications on any Multiline Terminal	A2	10-8
B. Partial Operations		
1. Radio Frequency Interference	B1	10-9
2. No or Intermittent CO/PBX Ring	C1	10-10
3. Call Dropping	C2	10-11
4. No Outside Dial Tone Access	C3	10-12
5. CO/PBX Dialing Problem: Cannot Dial Out on CO	C4	10-13
C. Multiline Terminal Problems		
1. Multiline Terminal Function	D1	10-14
2. Multiline Terminal Ringing	D2	10-15
3. Multiline Terminal Dial Tone Access	D3	10-16
D. Single Line Telephone Problems		
1. No Dial Tone Access on SLT	E1	10-17
2. No Ringing on SLT	E2	10-18
3. No Dial Access to SLT Features	E3	10-19
E. Low Volume Problems	F1	10-20
F. External Paging Problems	G1	10-21
G. SMDR Output Problems No Call Accounting System	H1	10-22

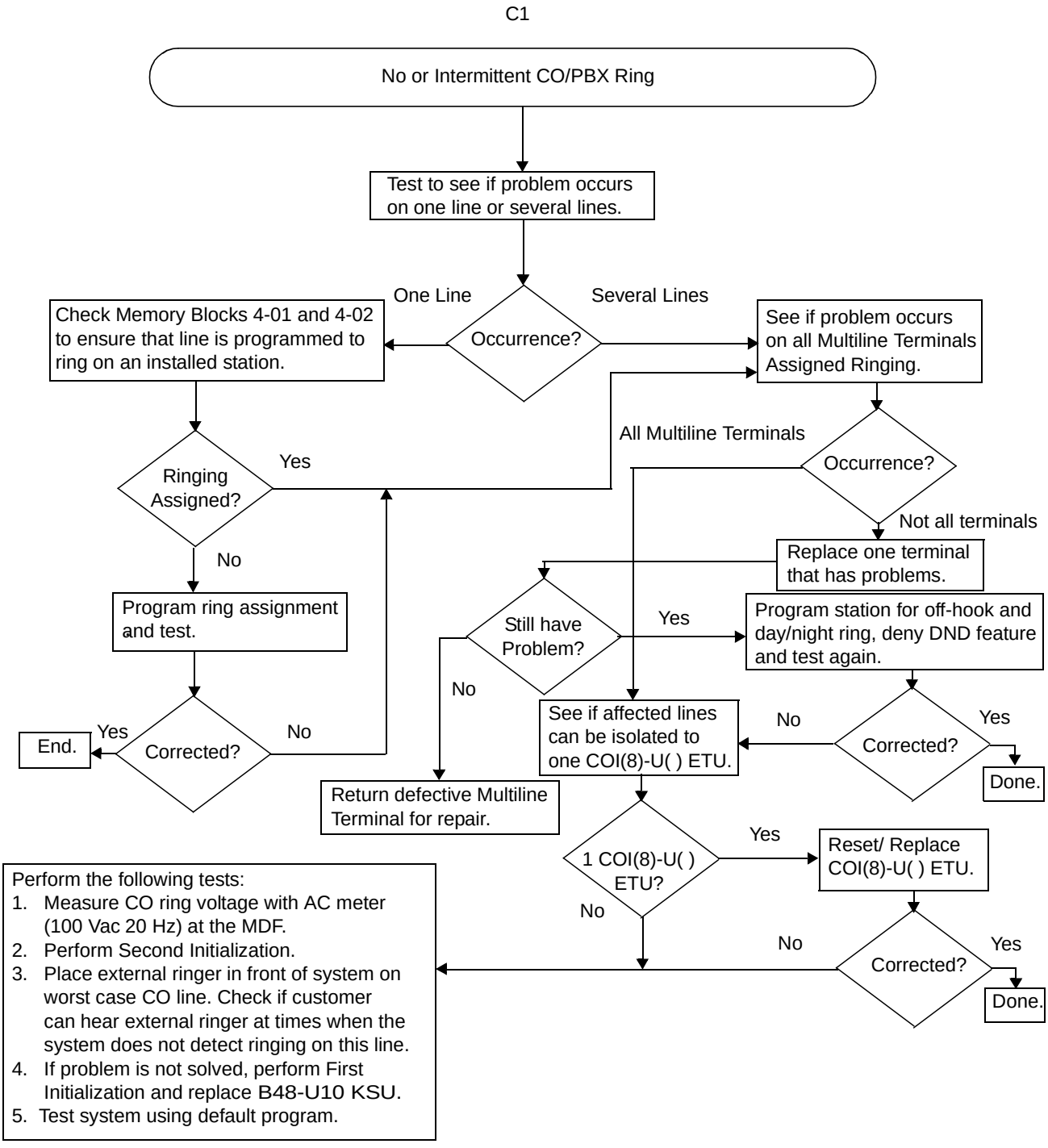
A1

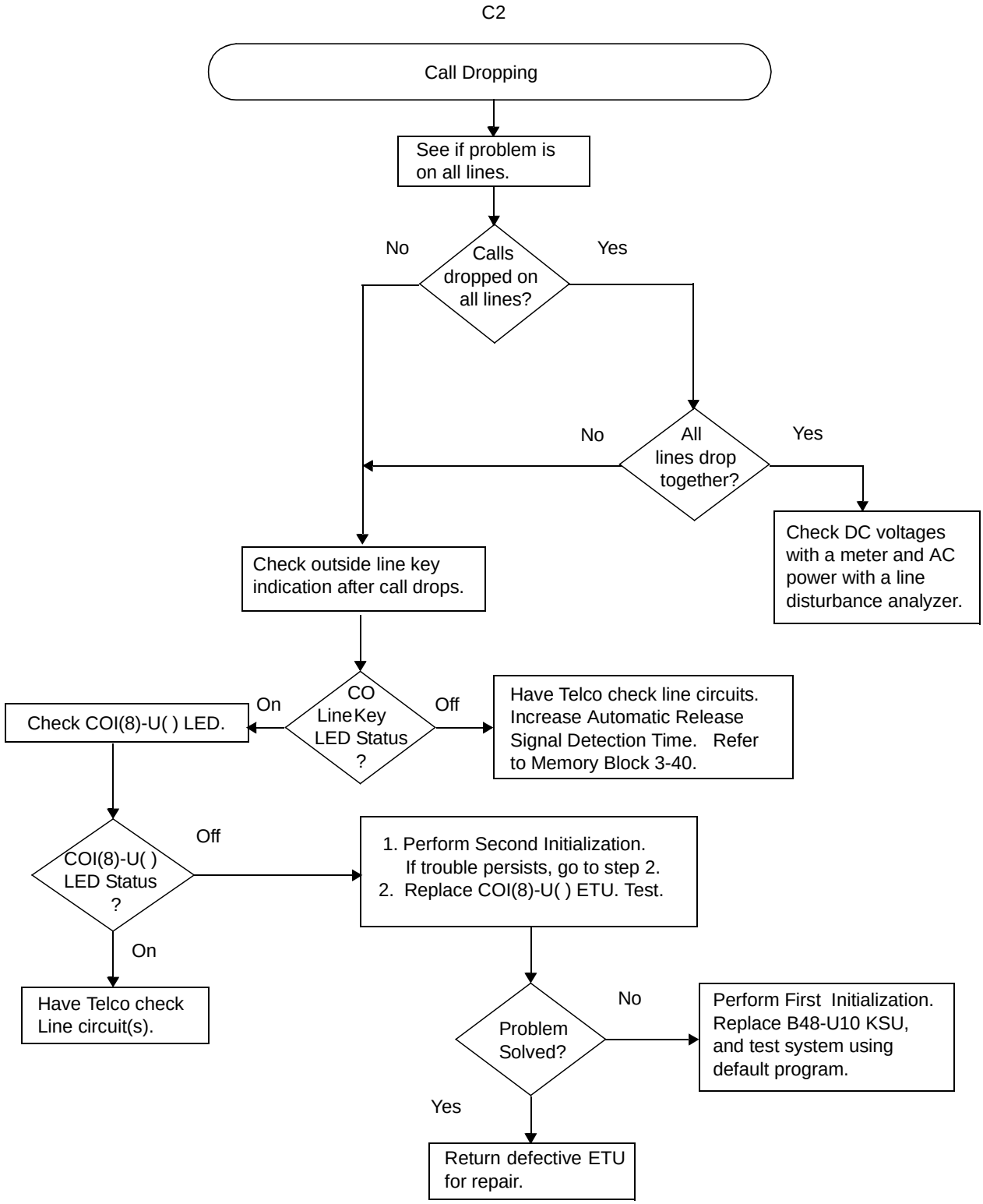

No Internal Dial Tone to any Multiline Terminal or SLT
DC Voltages Correct?
Incorrect or No DC Voltage
Check AC Input Power.
Good
Turn system Off. Disconnect all circuit boards.
Correct AC Power Problem.
Bad
AC Power?
Good
Turn system On. Dial tone on Multiline Terminal on 1st ESI(8)-U( ) (MBD-U10 Unit)?
Dial Tone
Replace Fuse(s).
Bad
PSU Fuses F1 & F2 ?
Good
Rebuild system, one card at a time until problem reappears. Replace defective card.
No Dial Tone
Reset ESI(8)-U( ) ETU. If trouble persists, replace B48-U10 KSU.
Replace Corresponding Power Supply.
Yes
Done.
Problem Solved?
No
Dial Tone
Dial Tone?
Remove all ETUs and retest.
No Dial Tone
Build system one card at a time, and replace bad ETU(s).
Yes
Problem Solved?
No
1. If problem not solved, perform First Initialization and test. If trouble persists, go to step 2.
2. Replace B48-U10 KSU and test system using default program.
Replace KSU.

A2

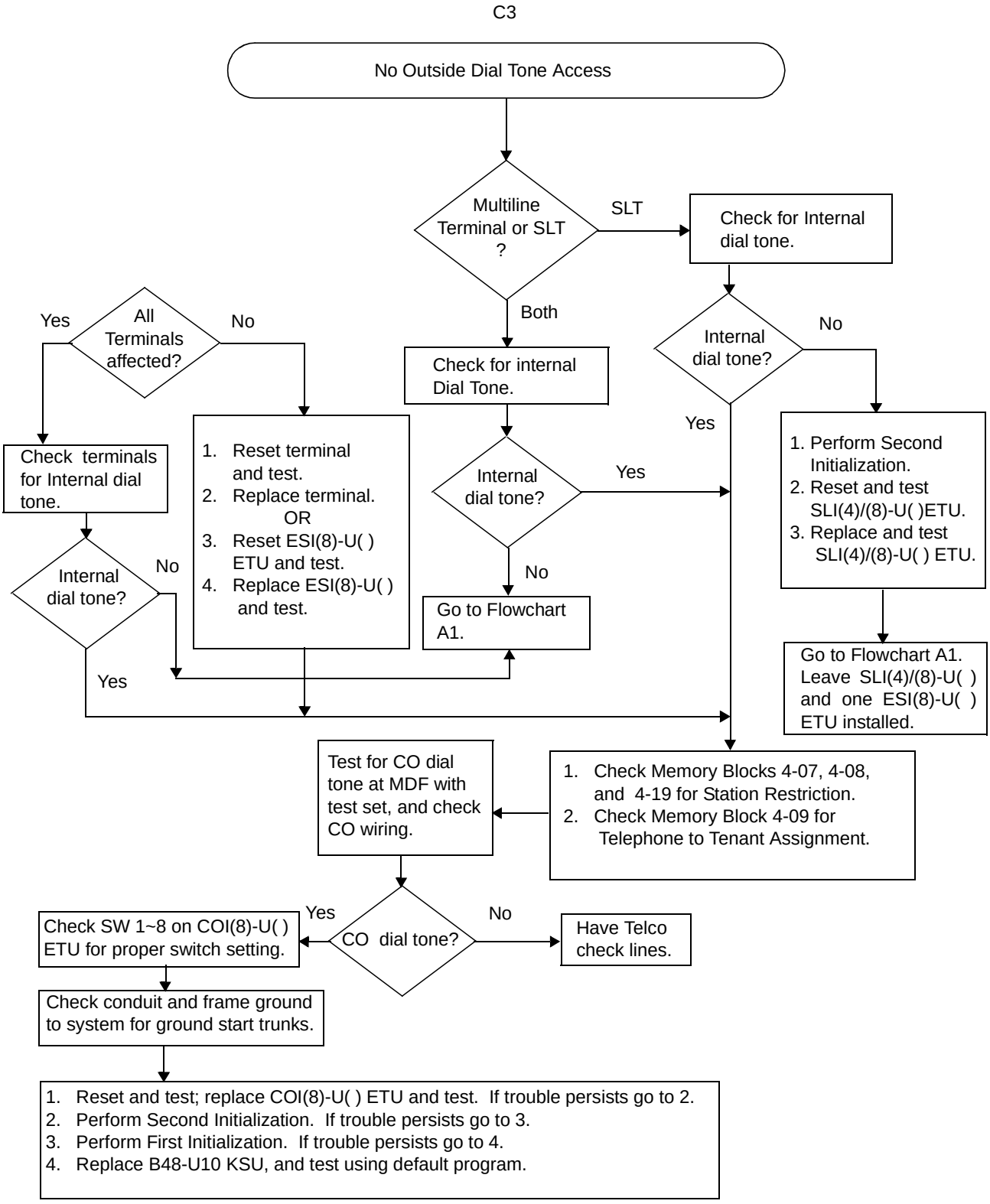

No LED or Display Indications on any Multiline Terminal
All DC Voltages OK?
Incorrect or No DC Voltage
Check AC Input Power.
Good
Terminate one Multiline Terminal from the KSU Programming Station directly to MDF and test.
Bad
Correct AC Power.
AC Power?
Good
Check Station Cabling.
Yes
Terminal Indications?
No
Turn system off. Disconnect connectors; remove all PC boards.
Replace Fuse(s).
Bad
PSU Fuses F1 & F2 ?
Good
Replace Corresponding Power Supply.
No Indication
Terminal Installed?
Yes
Done.
Problem Solved?
No
Reset MBD-U10 Unit. If trouble persists, replace B48-U( ) KSU.
Correct Indication
Rebuild System one card at a time. If problem reappears replace defective card(s).
Remove all ETUs and retest.
Indications?
Correct Indications
No Indication
Build system one card at a time, and replace bad ETU(s).
Yes
Problem Solved?
No
1. If problem not solved, perform First Initialization and test. If trouble persists, go to step 2.
2. Replace B48-U10 KSU and test system using default program.
Replace KSU.


B1
Radio Frequency Interference (RFI)
Is interference only on outside calls or anytime station is off-hook?
RFI Event?
On CO calls only
Remove one CO line at MDF and test using standard SLT.
No
RFI on CO Lines?
Yes
Inform Telco.
Multiline Terminal off-Hook
Check cable for the affected terminal(s).
More than 1-pair Twisted
1-pair
Twisted pair?
Ground all unused pairs at MDF.
Cable using 1-pair twisted pair cable.
No
No
RFI Cleared?
RFI Cleared?
Yes
Yes
End.
End.
Follow the steps below, one at a time, and test after each step.
1. Place a 0.01 microfarad ceramic capacitor (0.001 microfarad for FM Interference) across receiver and transmitter elements in the Multiline Terminal handset.
2. Add a 0.01 microfarad ceramic capacitor from one transmit lead to one receive lead.

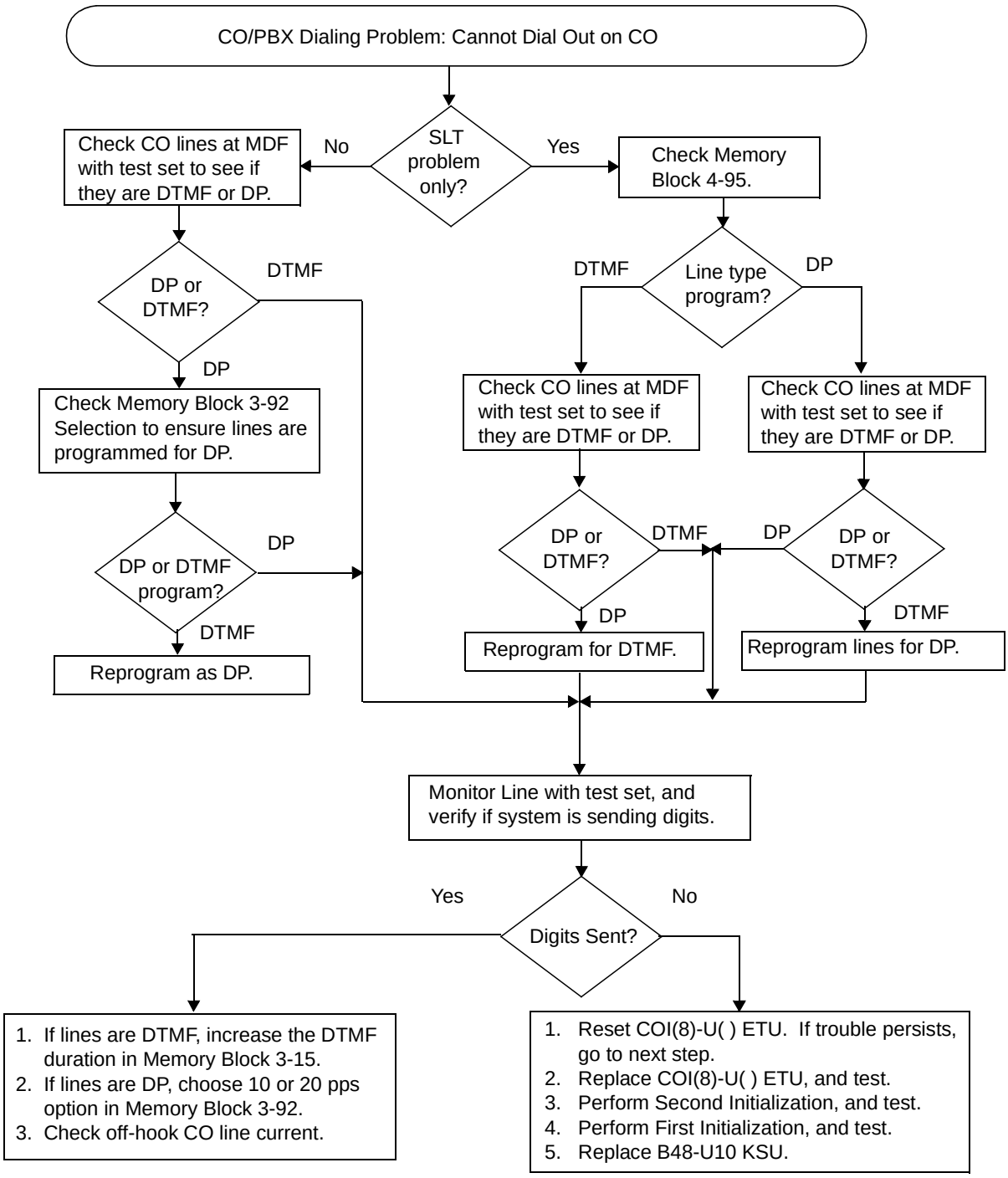

C1
No or Intermittent CO/PBX Ring
Test to see if problem occurs on one line or several lines.
Occurrence?
One Line
Several Lines
Check Memory Blocks 4-01 and 4-02 to ensure that line is programmed to ring on an installed station.
See if problem occurs on all Multiline Terminals Assigned Ringing.
Ringing Assigned?
Yes
No
All Multiline Terminals
Occurrence?
Not all terminals
Replace one terminal that has problems.
Program ring assignment and test.
Still have Problem?
Yes
No
Program station for off-hook and day/night ring, deny DND feature and test again.
End.
Yes
Corrected?
No
See if affected lines can be isolated to one COI(8)-U( ) ETU.
No
Corrected?
Yes
Done.
Return defective Multiline Terminal for repair.
1 COI(8)-U( ) ETU?
Yes
Reset/ Replace COI(8)-U( ) ETU.
No
No
Corrected?
Yes
Done.
Perform the following tests:
1. Measure CO ring voltage with AC meter (100 Vac 20 Hz) at the MDF.
2. Perform Second Initialization.
3. Place external ringer in front of system on worst case CO line. Check if customer can hear external ringer at times when the system does not detect ringing on this line.
4. If problem is not solved, perform First Initialization and replace B48-U10 KSU.
5. Test system using default program.

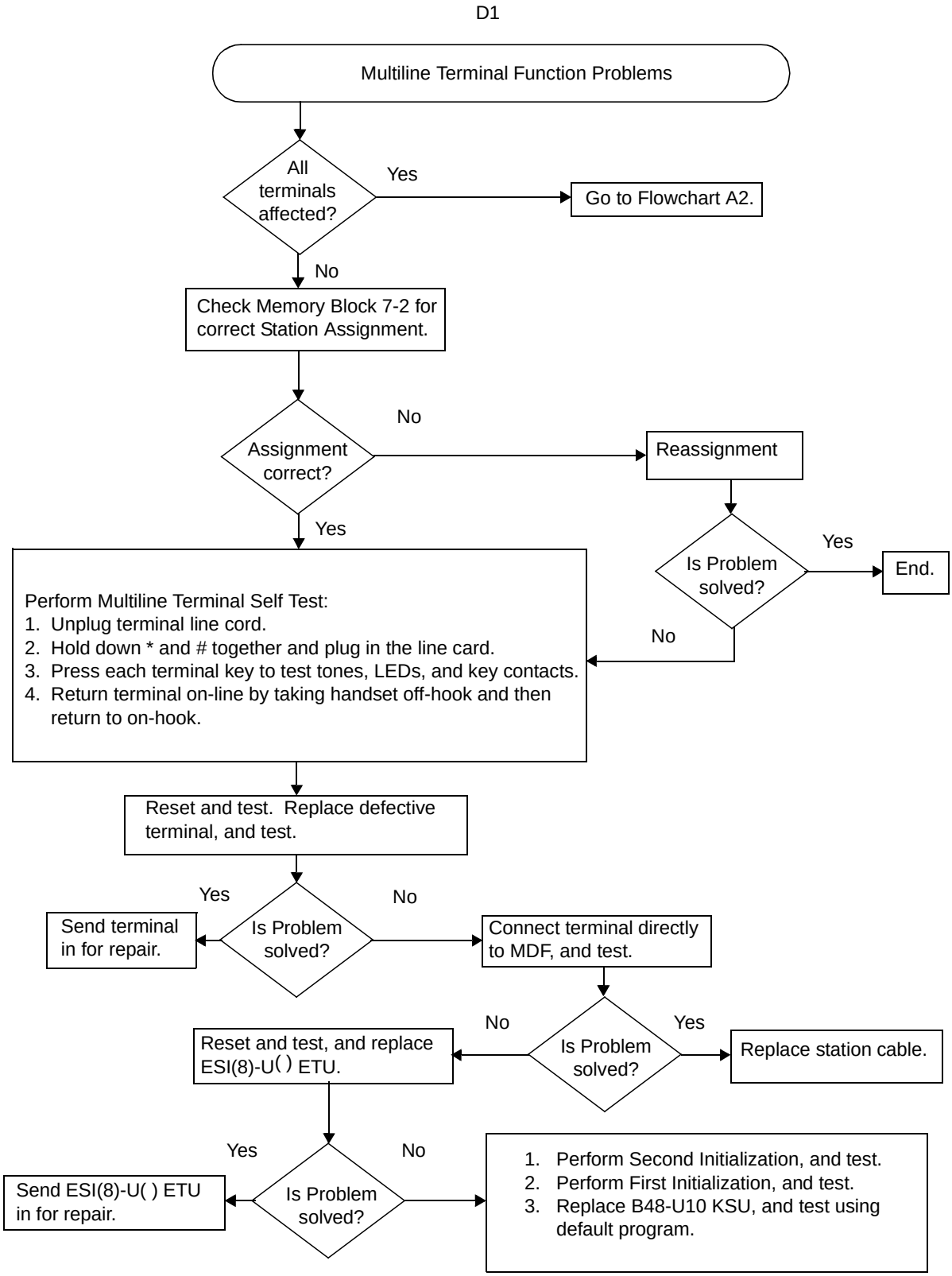

C2
Call Dropping
See if problem is on all lines.
Calls dropped on all lines?
No
Yes
All lines drop together?
No
Yes
Check DC voltages with a meter and AC power with a line disturbance analyzer.
Check outside line key indication after call drops.
CO Line Key LED Status ?
On
Off
Check COI(8)-U( ) LED.
Have Telco check line circuits. Increase Automatic Release Signal Detection Time. Refer to Memory Block 3-40.
COI(8)-U( ) LED Status ?
Off
On
1. Perform Second Initialization. If trouble persists, go to step 2.
2. Replace COI(8)-U( ) ETU. Test.
Have Telco check Line circuit(s).
Problem Solved?
No
Yes
Perform First Initialization. Replace B48-U10 KSU, and test system using default program.
Return defective ETU for repair.

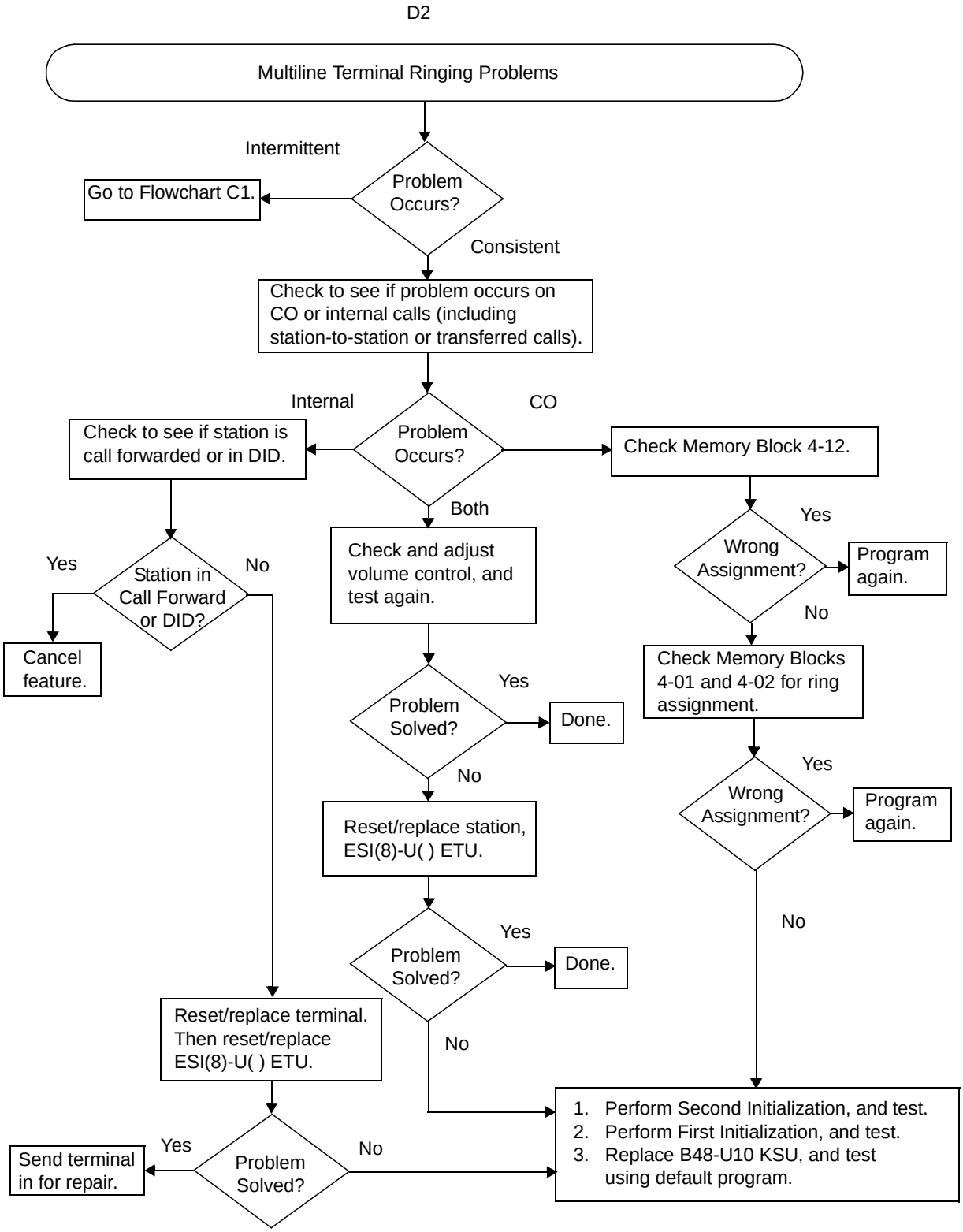
C3


No Outside Dial Tone Access
Multiline Terminal or SLT ?
SLT
Check for Internal dial tone.
Both
Internal dial tone?
No
Yes
1. Perform Second Initialization.
2. Reset and test SLI(4)/(8)-U( )ETU.
3. Replace and test SLI(4)/(8)-U( ) ETU.
Go to Flowchart A1. Leave SLI(4)/(8)-U( ) and one ESI(8)-U( ) ETU installed.
Check for internal Dial Tone.
Internal dial tone?
Yes
No
Go to Flowchart A1.
All Terminals affected?
Yes
No
Check terminals for Internal dial tone.
Internal dial tone?
No
Yes
1. Reset terminal and test.
2. Replace terminal.
OR
3. Reset ESI(8)-U( ) ETU and test.
4. Replace ESI(8)-U( ) and test.
1. Check Memory Blocks 4-07, 4-08, and 4-19 for Station Restriction.
2. Check Memory Block 4-09 for Telephone to Tenant Assignment.
Test for CO dial tone at MDF with test set, and check CO wiring.
CO dial tone?
Yes
No
Check SW 1~8 on COI(8)-U( ) ETU for proper switch setting.
Have Telco check lines.
Check conduit and frame ground to system for ground start trunks.
1. Reset and test; replace COI(8)-U( ) ETU and test. If trouble persists go to 2.
2. Perform Second Initialization. If trouble persists go to 3.
3. Perform First Initialization. If trouble persists go to 4.
4. Replace B48-U10 KSU, and test using default program.

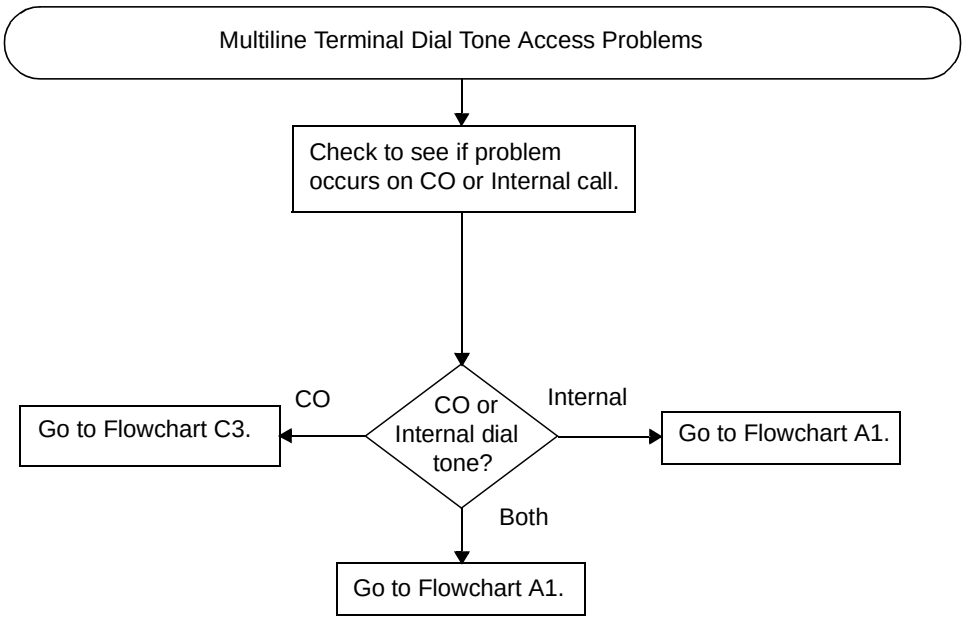
C4


CO/PBX Dialing Problem: Cannot Dial Out on CO
SLT problem only?
No
Yes
Check CO lines at MDF with test set to see if they are DTMF or DP.
Check Memory Block 4-95.
DP or DTMF?
DTMF
DP
Line type program?
DTMF
DP
Check Memory Block 3-92 Selection to ensure lines are programmed for DP.
Check CO lines at MDF with test set to see if they are DTMF or DP.
Check CO lines at MDF with test set to see if they are DTMF or DP.
DP or DTMF program?
DP
DTMF
Reprogram as DP.
DP or DTMF?
DTMF
DP
DP
DP or DTMF?
DP
DTMF
Reprogram for DTMF.
Reprogram lines for DP.
Monitor Line with test set, and verify if system is sending digits.
Yes
No
Digits Sent?
1. If lines are DTMF, increase the DTMF duration in Memory Block 3-15.
2. If lines are DP, choose 10 or 20 pps option in Memory Block 3-92.
3. Check off-hook CO line current.
1. Reset COI(8)-U( ) ETU. If trouble persists, go to next step.
2. Replace COI(8)-U( ) ETU, and test.
3. Perform Second Initialization, and test.
4. Perform First Initialization, and test.
5. Replace B48-U10 KSU.

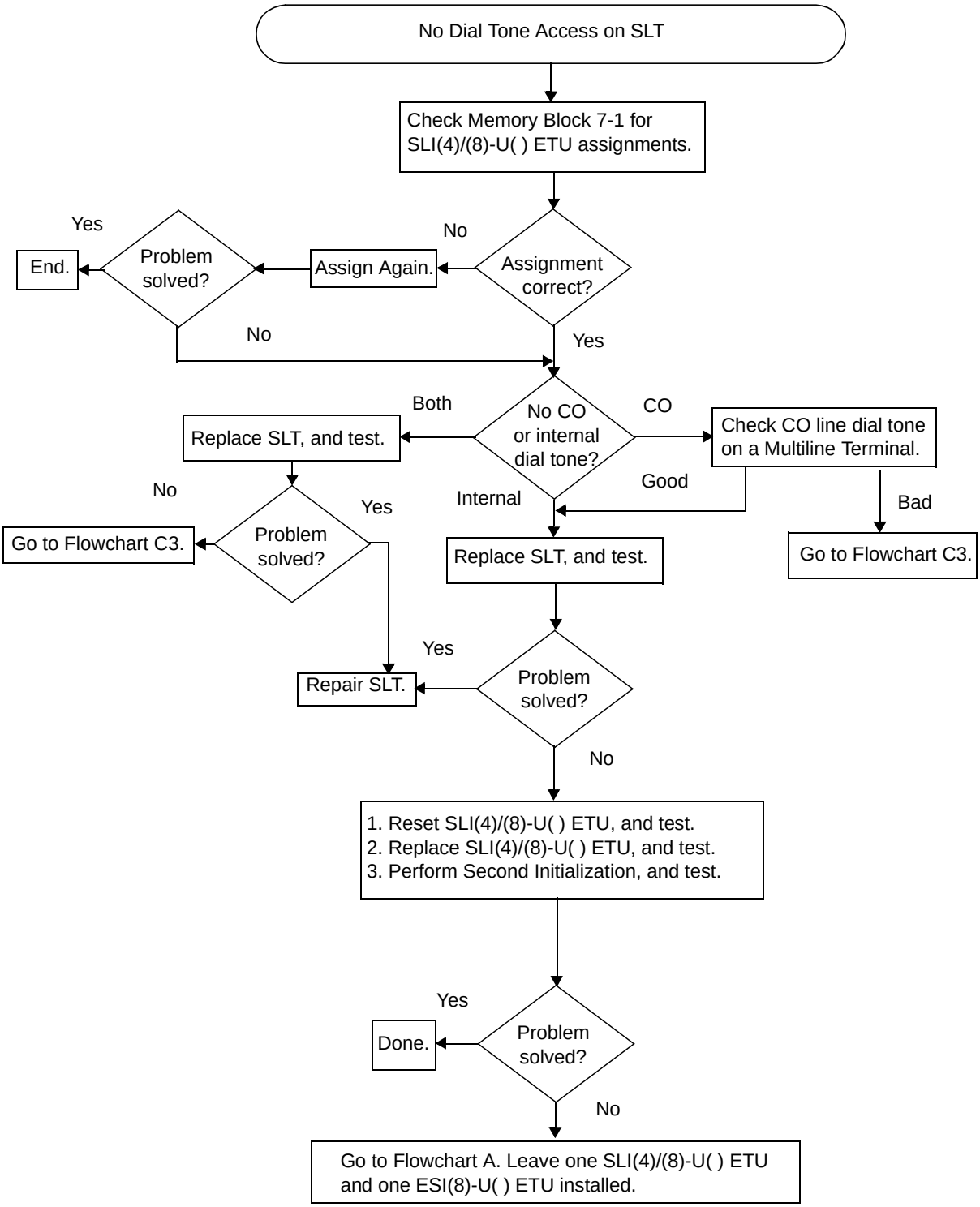

D1
Multiline Terminal Function Problems
All terminals affected?
Yes
Go to Flowchart A2.
No
Check Memory Block 7-2 for correct Station Assignment.
Assignment correct?
No
Reassignment
Is Problem solved?
Yes
End.
No
Yes
Perform Multiline Terminal Self Test:
1. Unplug terminal line cord.
2. Hold down * and # together and plug in the line card.
3. Press each terminal key to test tones, LEDs, and key contacts.
4. Return terminal on-line by taking handset off-hook and then return to on-hook.
Reset and test. Replace defective terminal, and test.
Is Problem solved?
Yes
Send terminal in for repair.
No
Connect terminal directly to MDF, and test.
Is Problem solved?
No
Yes
Reset and test, and replace ESI(8)-U( ) ETU.
Replace station cable.
Is Problem solved?
Yes
Send ESI(8)-U( ) ETU in for repair.
No
1. Perform Second Initialization, and test.
2. Perform First Initialization, and test.
3. Replace B48-U10 KSU, and test using default program.


D2
Multiline Terminal Ringing Problems
Intermittent
Problem Occurs?
Go to Flowchart C1.
Consistent
Check to see if problem occurs on CO or internal calls (including station-to-station or transferred calls).
Internal
Problem Occurs?
CO
Check to see if station is call forwarded or in DID.
Check Memory Block 4-12.
Both
Yes
Station in Call Forward or DID?
No
Cancel feature.
Check and adjust volume control, and test again.
Wrong Assignment?
Yes
Program again.
No
Check Memory Blocks 4-01 and 4-02 for ring assignment.
Problem Solved?
Yes
Done.
No
Wrong Assignment?
Yes
Program again.
Reset/replace station, ESI(8)-U( ) ETU.
Problem Solved?
Yes
Done.
No
Reset/replace terminal. Then reset/replace ESI(8)-U( ) ETU.
No
1. Perform Second Initialization, and test.
2. Perform First Initialization, and test.
3. Replace B48-U10 KSU, and test using default program.
Problem Solved?
Yes
Send terminal in for repair.
No

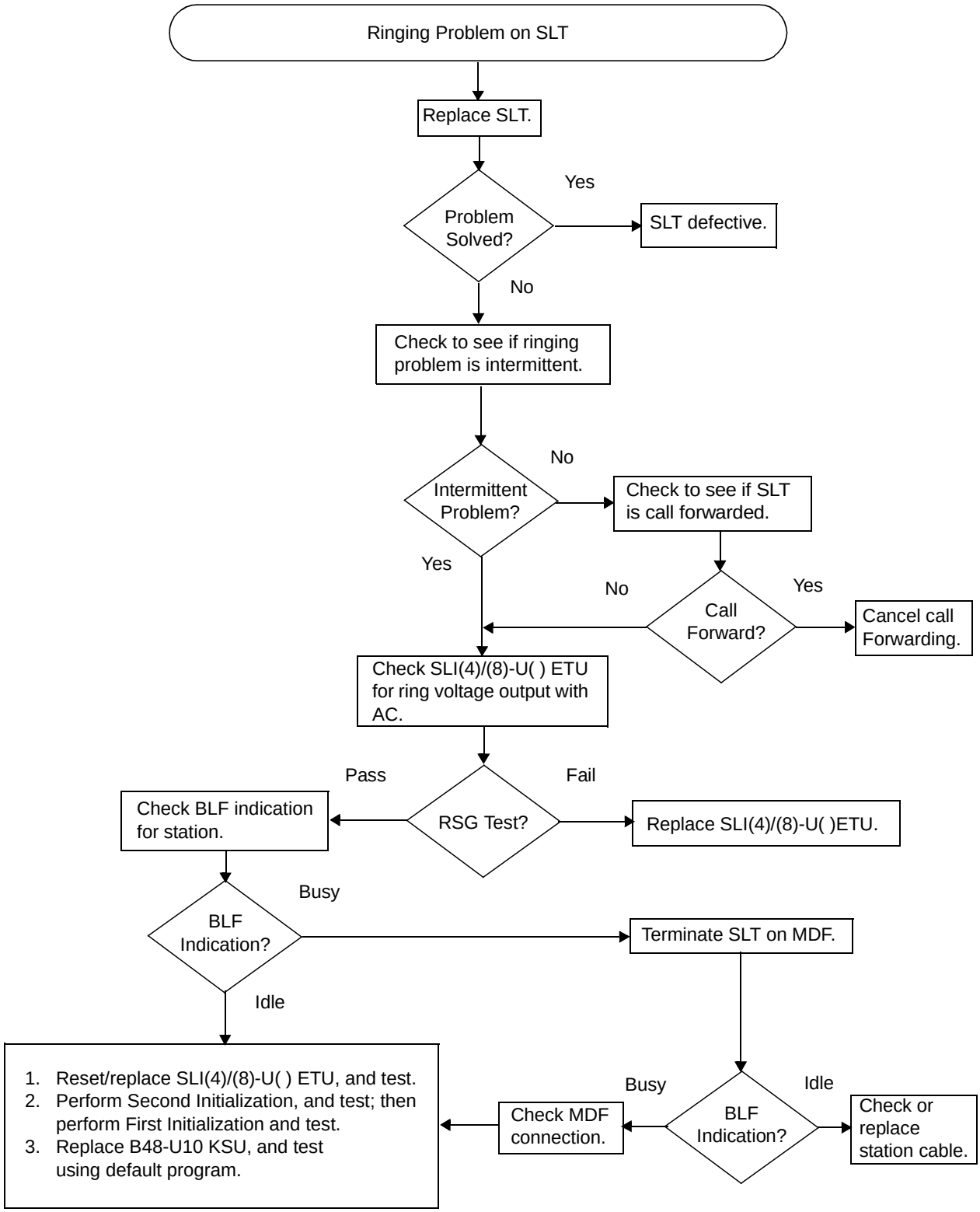
D3


Multiline Terminal Dial Tone Access Problems
Check to see if problem occurs on CO or Internal call.
CO or Internal dial tone?
CO
Internal
Both
Go to Flowchart C3.
Go to Flowchart A1.
Go to Flowchart A1.

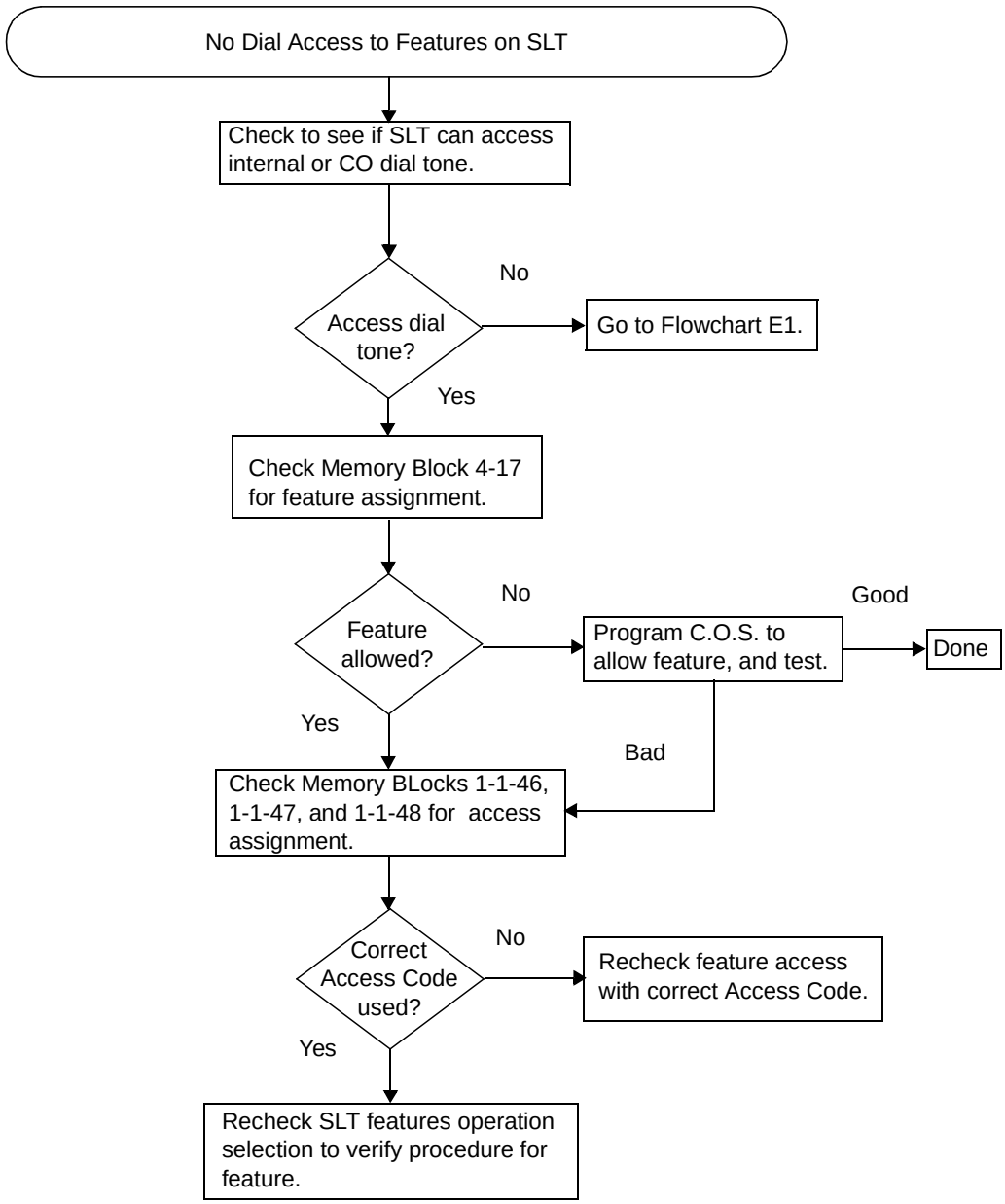
E1


No Dial Tone Access on SLT
Check Memory Block 7-1 for SLI(4)/(8)-U( ) ETU assignments.
Assignment correct?
No
Assign Again.
Problem solved?
Yes
End.
No
Yes
No CO or internal dial tone?
Both
Replace SLT, and test.
CO
Check CO line dial tone on a Multiline Terminal.
Good
Bad
Internal
Go to Flowchart C3.
Problem solved?
No
Yes
Go to Flowchart C3.
Replace SLT, and test.
Problem solved?
Yes
Repair SLT.
No
1. Reset SLI(4)/(8)-U( ) ETU, and test.
2. Replace SLI(4)/(8)-U( ) ETU, and test.
3. Perform Second Initialization, and test.
Problem solved?
Yes
Done.
No
Go to Flowchart A. Leave one SLI(4)/(8)-U( ) ETU and one ESI(8)-U( ) ETU installed.

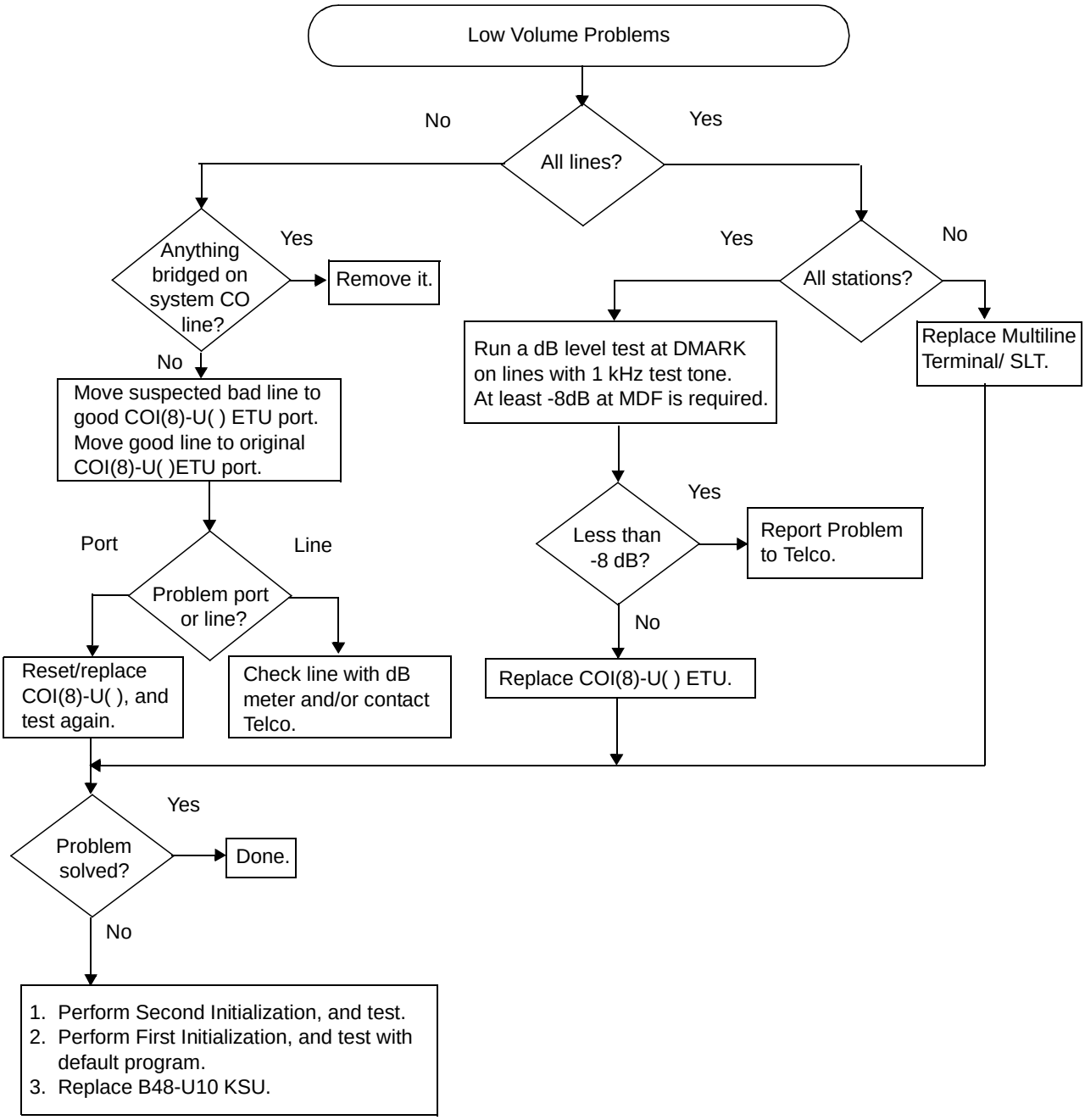
E2

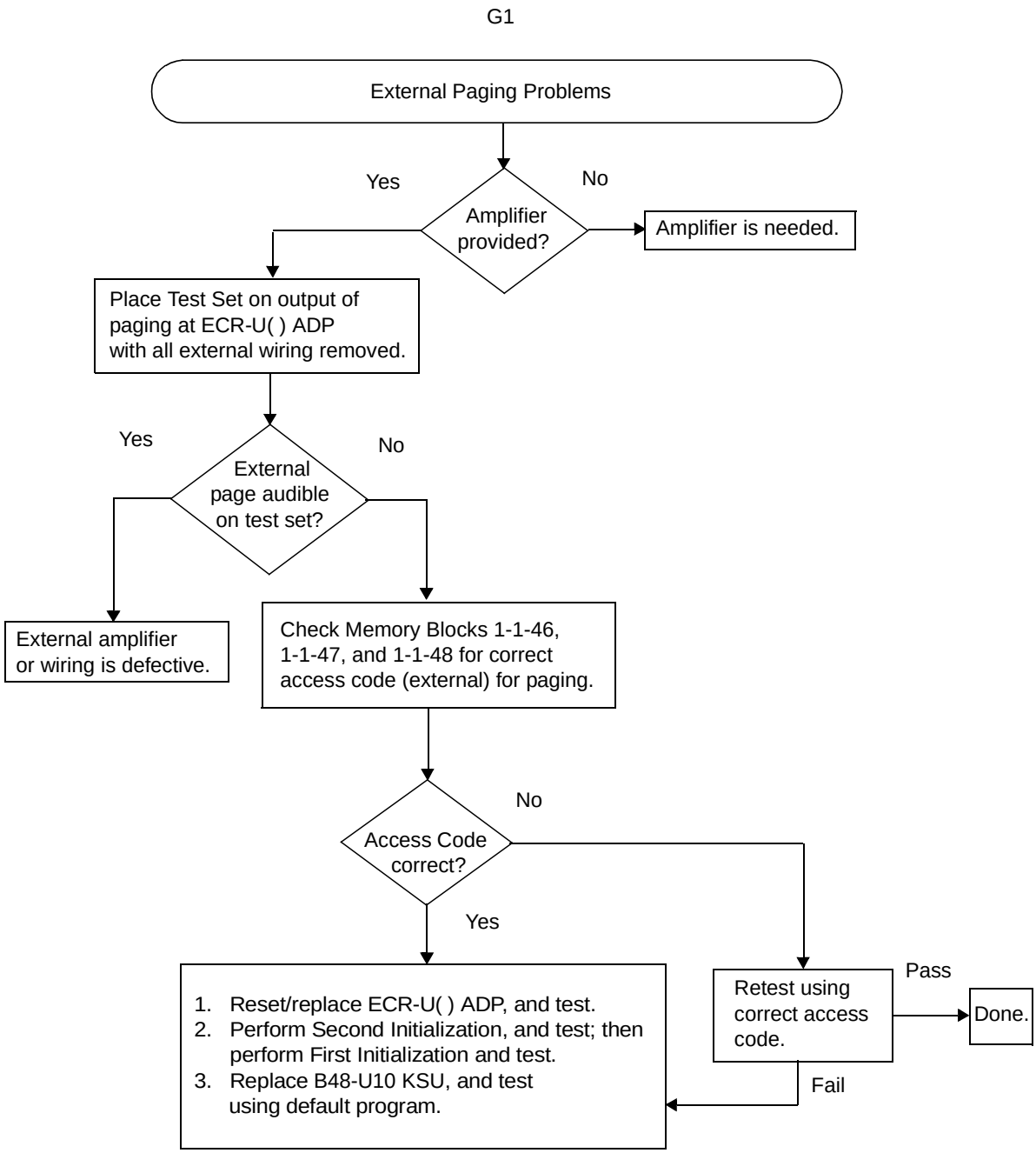

Ringing Problem on SLT
Replace SLT.
Problem Solved?
Yes
SLT defective.
No
Check to see if ringing problem is intermittent.
Intermittent Problem?
No
Check to see if SLT is call forwarded.
Yes
Call Forward?
No
Yes
Cancel call Forwarding.
Check SLI(4)/(8)-U( ) ETU for ring voltage output with AC.
RSG Test?
Pass
Fail
Check BLF indication for station.
Replace SLI(4)/(8)-U( )ETU.
BLF Indication?
Busy
Terminate SLT on MDF.
Idle
1. Reset/replace SLI(4)/(8)-U( ) ETU, and test.
2. Perform Second Initialization, and test; then perform First Initialization and test.
3. Replace B48-U10 KSU, and test using default program.
Check MDF connection.
BLF Indication?
Busy
Idle
Check or replace station cable.

E3

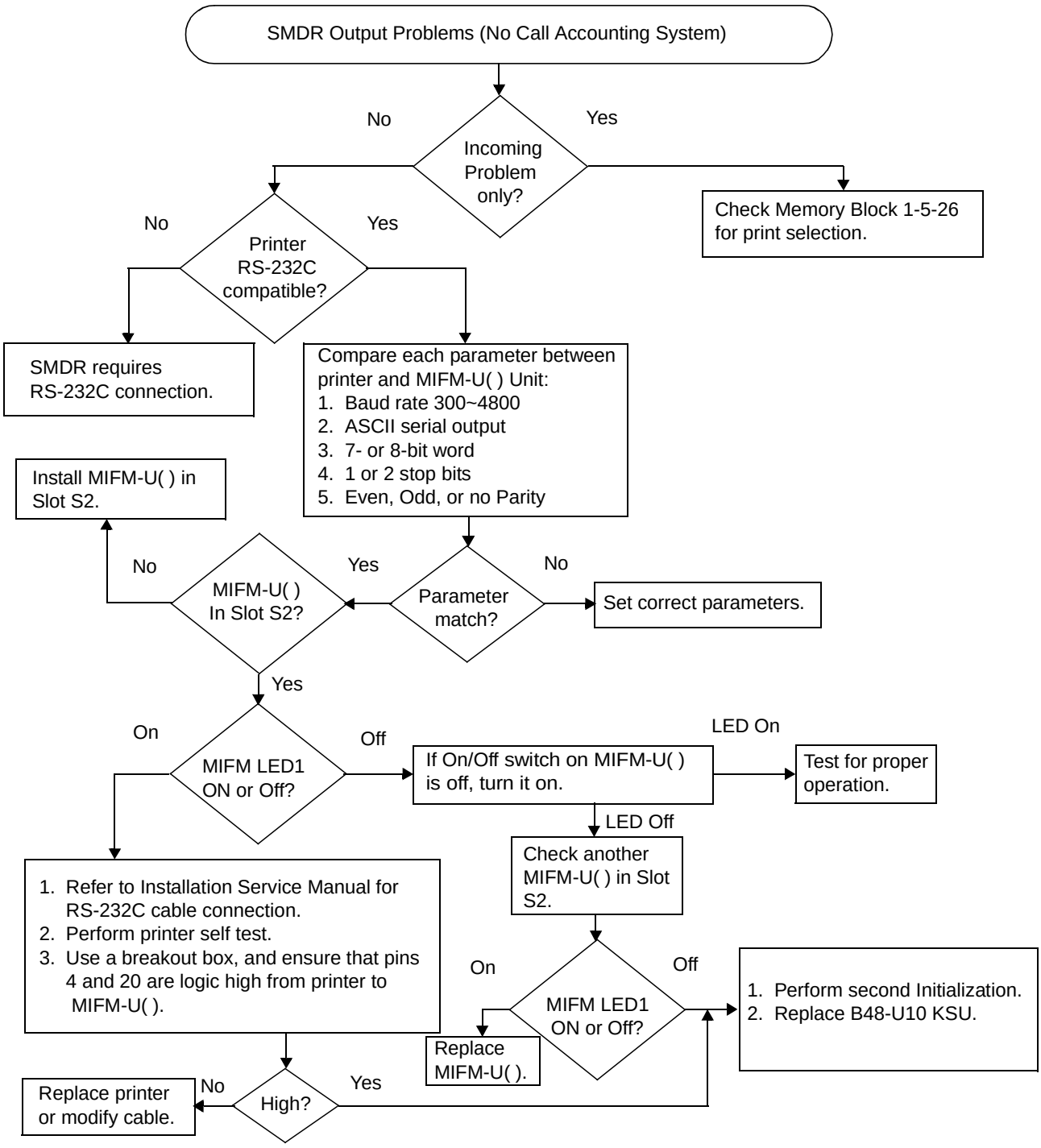

No Dial Access to Features on SLT
Check to see if SLT can access internal or CO dial tone.
Access dial tone?
No
Go to Flowchart E1.
Yes
Check Memory Block 4-17 for feature assignment.
Feature allowed?
No
Program C.O.S. to allow feature, and test.
Good
Done
Yes
Bad
Check Memory BLocks 1-1-46, 1-1-47, and 1-1-48 for access assignment.
Correct Access Code used?
No
Recheck feature access with correct Access Code.
Yes
Recheck SLT features operation selection to verify procedure for feature.

F1


Low Volume Problems
All lines?
No
Yes
Anything bridged on system CO line?
Yes
Remove it.
No
Move suspected bad line to good COI(8)-U( ) ETU port. Move good line to original COI(8)-U( )ETU port.
Port
Line
Problem port or line?
Reset/replace COI(8)-U( ), and test again.
Check line with dB meter and/or contact Telco.
Yes
All stations?
No
Replace Multiline Terminal/ SLT.
Run a dB level test at DMARK on lines with 1 kHz test tone. At least -8dB at MDF is required.
Yes
Less than -8 dB?
Report Problem to Telco.
No
Replace COI(8)-U( ) ETU.
Yes
Problem solved?
Done.
No
1. Perform Second Initialization, and test.
2. Perform First Initialization, and test with default program.
3. Replace B48-U10 KSU.


G1
External Paging Problems
Yes
No
Amplifier provided?
Amplifier is needed.
Place Test Set on output of paging at ECR-U( ) ADP with all external wiring removed.
Yes
No
External page audible on test set?
External amplifier or wiring is defective.
Check Memory Blocks 1-1-46, 1-1-47, and 1-1-48 for correct access code (external) for paging.
No
Access Code correct?
Yes
1. Reset/replace ECR-U( ) ADP, and test.
2. Perform Second Initialization, and test; then perform First Initialization and test.
3. Replace B48-U10 KSU, and test using default program.
Retest using correct access code.
Pass
Done.
Fail

H1


SMDR Output Problems (No Call Accounting System)
Incoming Problem only?
No
Yes
Check Memory Block 1-5-26 for print selection.
Printer RS-232C compatible?
No
Yes
SMDR requires RS-232C connection.
Compare each parameter between printer and MIFM-U( ) Unit:
1. Baud rate 300~4800
2. ASCII serial output
3. 7- or 8-bit word
4. 1 or 2 stop bits
5. Even, Odd, or no Parity
Install MIFM-U( ) in Slot S2.
MIFM-U( ) In Slot S2?
No
Yes
Parameter match?
No
Set correct parameters.
Yes
MIFM LED1 ON or Off?
On
Off
If On/Off switch on MIFM-U( ) is off, turn it on.
LED On
Test for proper operation.
LED Off
Check another MIFM-U( ) in Slot S2.
1. Refer to Installation Service Manual for RS-232C cable connection.
2. Perform printer self test.
3. Use a breakout box, and ensure that pins 4 and 20 are logic high from printer to MIFM-U( ).
MIFM LED1 ON or Off?
On
Off
Replace MIFM-U( ).
1. Perform second Initialization.
2. Replace B48-U10 KSU.
High?
No
Yes
Replace printer or modify cable.

Glossary of Abbreviations

APPENDIX A

The following table includes common abbreviations used throughout this document that are listed in alphabetical order.

Abbreviations	Definition
ACD	Automatic Call Distribution Provides a cost-effective method for supervising incoming telephone traffic and associated staff activity.
AIS	Alarm Indication Signal Replaces the normal traffic signal when a maintenance alarm indication is activated. An AIS signal is transmitted downstream to indicate an upstream failure was detected.
BNC	Bayonet-Neill-Concelman Connector for slim coaxial cables. This is similar to ones used with Ethernet.
BPV	Bipolar Violation Indicates the presence of two consecutive one bits of the same polarity on a T carrier line.
BRI	Basic Rate Interface ISDN subscriber interface. BRI has two bearer B-channels at 64 Kbps per second and a D-channel at 16 Kbps per second. The bearer B-channels are provided for PCM voice, video conferencing, group 4 facsimile machines, and other similar types of transmissions. The data D-channel used to bring in information about incoming calls and take out information about outgoing calls. BRI can also be used to access slow-speed data networks such as videotex and packet switched networks. BRI has two standards: U Interface for 2-wire T Interface for 4-wire

Abbreviations	Definition
CRC	Cyclic Redundancy Check CRC is a common method to establish that the data is correctly received in data communications. This process checks the integrity of a block of data. A CRC character is generated at the transmission end. Its value depends on the hexadecimal value of the number of ones in the data block. The transmitting device calculates the value and appends it to the data block. The receiving end makes a similar calculation and compares its results with the added character. If there is a difference, the recipient requests retransmission.
DN	Directory Number Unique number (phone number) assigned to each telephone or data terminal.
ISDN	Integrated Services Digital Network An international plan to migrate the public switched network to the universal implementation of standard digital technology.
LSA	Line Synchronization Alarm Detection A T1 trunk looses frame synchronization. Frame synchronization occurs when a given digital channel (time slot) at the receiving end is aligned with the corresponding channel (time slot) of the transmitting end as it occurs in the received signal. Usually extra bits (frame synchronization bits) are inserted at regular intervals to indicate the beginning of a frame and for use in frame synchronization.
LCR	Least Cost Routing A feature that automatically chooses the lowest cost phone line to the destination.
OOF	Out-of-Frame Condition During T1 transmission, an Out-of-Frame error occurs when two or more of four consecutive framing bits are in error. When this condition exists for more than 2.5 seconds a Red alarm is sent by the OOF detecting unit. Equipment that receives this Red alarm responds with a Yellow alarm.
OPX	Off-Premise Extension A telephone that is located in a different office or building from the mail phone system. The OPX is connected by a dedicated telephone line. This extension has all abilities of the mail phone system.

Abbreviations	Definition
PRI	Primary Rate Interface ISDN subscriber interface. PRI has 23 bearer B-channels at 64 Kbps per second and a D-channel at 64 Kbps per second. The bearer B-channels are provided for PCM voice, video conferencing, group 4 facsimile machines, and other similar types of transmissions. The data D-channel used to bring in information about incoming calls and take out information about outgoing calls. PRI can also be used to access slow-speed data networks such as videotex and packet switched networks. PRI has two standards: U Interface for 2-wire T Interface for 4-wire
SLIP	Serial Line Internet Protocol An Internet protocol is used to run IP over serial lines such as telephone circuits. IP is the Internet Protocol; the most important of all protocols on which the Internet is based. This protocol allows a packet to traverse multiple networks before it reaches its final destination.
SMDR	Station Message Detail Recording A feature that collects and records information on outgoing calls by station.
SPID	Service Profile Identifier IDSN service is ordered with certain parameters. The SPID is an 8- to 12-digit number that uniquely identifies the service ordered. The phone company assigns an SPID for every phone number. Each ISDN BRI line usually has two phone numbers. The SPID is a label identifier that points to a particular location on the telephone company central office memory that stores the details of the ISDN services ordered. This number is necessary for the operation of the ISDN phone, fax, or PC software. Without this number, ISDN services cannot be accessed.
VoIP	Voice over Internet Protocol The ability to carry normal telephone-style voice over an IP-based internet with POTS-like functionality, reliability, and voice quality. The Public Switched Telephone Network (PSTN) connects to the LAN IP network through a VoIP gateway. Digitized speech is transported through IP packets and can include real-time conversation or voice mail. The IP network can be public/private, and voice transport can be telephone-to-telephone, computer-to-telephone, or computer-to-computer.

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Issue 7

(Series 9500)